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A CLINICAL AND MYCOLOGICAL STUDY OF SUPPURATIVE RINGWORM*

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DURING the past three years a series of cases of suppurative ringworm has been investigated in the Winnipeg Children's and Winnipeg General Hospitals. In this series suppurative ringworm includes all types of ringworm which attack the deeper layers of the skin and hair follicles and produce nodules with suppuration. This grouping, while new, has some advantages which will be demonstrated later.

CLINICAL STUDIES

The clinical types of suppurative ringworm are as follows: (*a*) kerion; (*b*) sycosis parasitaria; (*c*) agminate folliculitis.

Kerion is suppurative ringworm of the scalp (Fig. 2). Clinically, it is characterized by large, boggy masses which rise abruptly from the surrounding tissue. They are angry red in colour and are dotted over with peri-follicular abscesses. The hairs in these follicles are either lustreless and broken or are shed completely, leaving gaping holes containing some purulent fluid. The neighbouring lymph nodes are usually enlarged. The secondary manifestation is in the form of a papular rash known as a trichophytid (Fig. 1).

Sycosis parasitaria is considered here to be suppurative ringworm of the beard. This conception is in accord with Sabouraud, in that the name "sycosis" is reserved for intradermal nodular suppurations which may or may not be subjacent to superficial lesions which are exudative and suppurating. The superficial, dry type of ringworm of the beard sometimes classed as a form of sycosis parasitaria is therefore omitted. Although a common occurrence in Europe, it has never been found in our clinic. Sycosis parasitaria is clinically very similar to kerion of the scalp (Fig. 3). The lesions may appear anywhere on the beard region. They are usually more diffuse than kerion and consist of dusky red nodules and boggy masses, both of which are studded over with yellow pustules. Similar peri-follicular pustules and lustreless hairs are present. There is adenitis of the regional lymph nodes. The deep boggy masses which Sabouraud differentiates as being kerion of the beard are included in this group. None of these lesions showed any evidence of a superficial scaliness preceding the deep infection. The earliest lesions noted were peri-follicular papules and small nodules.

Agminate folliculitis is suppurative ringworm of the glabrous skin (Fig. 4). Clinically, it is characterized by circumscribed groups of dusky red nodules, centred around peri-follicular abscesses. The whole lesion is scaly and the hairs lustreless and fragile. Usually there is not as much suppuration as with the other types.

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INCIDENCE

Studies have been made of 46 cases of suppurative ringworm, grouped as in Table I.

TABLE I

NUMBER OF CASES OF SUPPURATIVE RINGWORM

Type of lesion	*Number of patients*
(1) Kerion	10
(2) Sycosis parasitaria	29
(3) Agminate folliculitis	7
Total	46

These patients were from one portion of the community. They were all farmers or cattle-dealers. There was only one exception. He was a grain inspector who developed an agminate folliculitis of the left wrist. Suppurative ringworm in our experience is always derived from rural districts, and usually a direct history of contact with infected cattle is available.

A very pronounced seasonal variation was noted in the incidence of sycosis parasitaria. The majority of these patients came for treatment during the late winter and early spring months. To obtain a clearer picture of the seasonal incidence, the date of onset in each case was estimated from the patient's history. Fig. 8 shows the incidence by months and indicates that 14 out of the 29 cases began in February and March. Probably the confining of cattle in barns for the winter months provides an opportunity for the fungus to spread. By the end of the winter the calves, and, later, the men have had time to become infected. Is it possible that this seasonal incidence is peculiar to Canada? Would not similar results be obtained if investigations were carried out in corresponding latitudes where similar agricultural conditions prevail?

MYCOLOGICAL STUDIES

Microscopical findings. — Microscopical examinations were made of scales or infected hairs from all patients in this series. It was found that scales should be taken from the advancing edge of the lesion. The most suitable hairs for examination were the lustreless, broken hairs which could be extracted easily, or hairs covered with crusts and centred in pustules. Negative reports were of no value unless the material was collected with these precautions. The

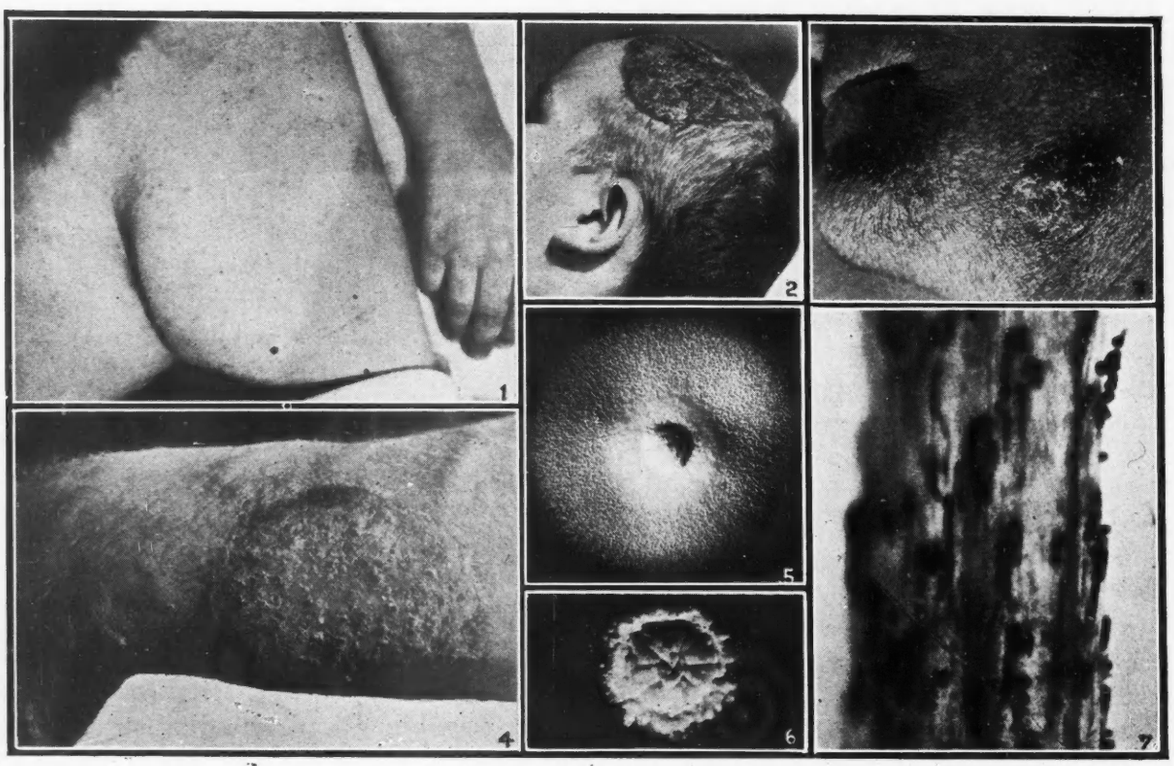

FIG. 1.—Trichophytid. FIG. 2.—Kerion. FIG. 3.—Sycosis parasitaria. FIG. 4.—Agminate folliculitis. FIG. 5.—Culture of *T. gypseum* after 18 days' growth at room temperature on Sabouraud's maltose peptone agar (actual size). FIG. 6.—Culture of *T. album* after 109 days' growth at room temperature on Sabouraud's maltose peptone agar (actual size). FIG. 7.—Hair infected by *Trichophyton ectothrix megalosporon*, showing chains of spores and hyphæ. (mag. 300).

filtered ultra-violet light was of no advantage in selecting specimens, the fluorescence of infected hairs being blue rather than the typical green found with hairs of tinea capitis. The specimens were placed on glass slides and mounted under a cover-slip in Liquor Potassæ B.P. A modified Gram's stain was used in some cases where a permanent preparation was desired, but was not necessary for a rapid examination for fungi. On examining the specimens under the high power objective of a microscope, chains of spores and hyphæ were seen (Fig. 7).

The fungi encountered all belonged to the ectothrix group of the genus Trichophyton, as follows: (1) *Trichophyton ectothrix microides,* with spores 3 μ in diameter; (2) *Trichophyton ectothrix megalosporon,* with spores 6 μ in diameter.

The megalosporon group appeared more commonly than the microides group. The incidence of the two groups was:

Trichophyton megalosporon .....28 cases
Trichophyton microides ..... 7 cases

This result contrasts with that of Sabouraud, whose records of dermatomycoses in Paris showed *Trichophyton microides* to be nearly twice as frequent as *Trichophyton megalosporon.*

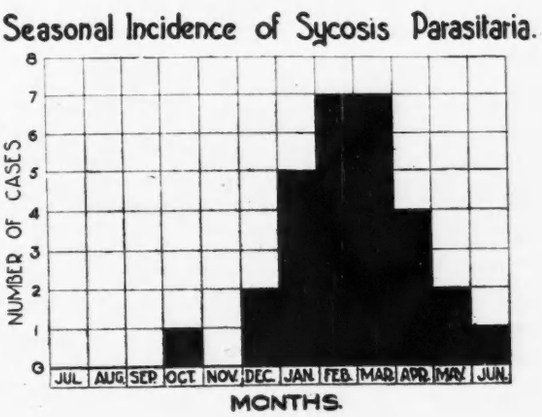

FIG. 8

Cultural findings.—The actual species present can only be determined by making cultures on Sabouraud's standard media. Specimens were usually soaked in 90 per cent alcohol for from 3 to 5 minutes and then planted on agar slants. The culture tubes were kept at room temperature. Two species of Trichophyton were obtained from these cases of suppurative ringworm. Hairs which microscopical examination showed to be infected with a *Trichophyton microides* produced a rapidly growing, powdery culture, which was identified as *Trichophyton gypseum* (Fig. 5). The fungus in hairs infected by *Trichophyton megalosporon* was difficult to isolate, but from a third of the cases a very slow-growing, glabrous, elevated culture of *Trichophyton album* was obtained (Fig. 6). The difficulty experienced in isolating this species is attributed to bacterial contaminants swamping the slow-growing ringworm fungus. In *T. gypseum* the fungus was able to outgrow competitors. The mean daily radial growth rate of the two organisms on Sabouraud's medium at two temperatures is contrasted in Table II.

TABLE II
RADIAL DAILY GROWTH OF TWO TRICHOPHYTON SPECIES

	Room temperature (about 20°C.)	*Temperature 30°C.*
T. gypseum	1.7 mm.	2.75 mm.
T. album	0.19 mm.	0.45 mm.

It is interesting to note that *T. album* has been obtained 9 times in this series, whereas Sabouraud reports finding *T. album* only once in 500 cases of dermatomycosis in Paris.

TRICHOPHYTIN TEST

The trichophytin test for ringworm is an intradermal test similar to the tuberculin test for tuberculosis. The trichophytin used in this series was a protein extract of cultures of *T. gypseum.* One-tenth of a cubic centimetre of trichophytin was injected intradermally into the volar surface of the forearm. The reaction was noted at twenty-four and forty-eight hours. The standard readings for the tuberculin test were adopted in the series. Table III shows the results obtained from 70 cases of fungus infections of the skin in which the type of fungus was identified. The reactions varied directly with the type of fungus and its ability to produce a deep infection.

TABLE III
TRICHOPHYTIN TESTS

Fungus	*No. of cases*	*Result*					
		Neg.	*Pos.*	+	++	+++	++++
M. audouini	45	32	13	6	5	2	0
M. felineum	7	6	1	0	1	0	0
Achorion schoenleini ...	3	3	0	0	0	0	0
T. album	9	0	9	0	1	5	3
T. gypseum	2	0	2	0	1	1	0
T. ectothrix sp. .	4	0	4	2	0	2	0
Total	70	41	29	8	8	10	3

Fifteen cases of suppurative ringworm were tested and all were positive. Tests were also made on 52 cases of superficial ringworm and 3 cases of favus, the majority being negative and the remainder mildly positive. Only 2 cases of the superficial infection were definitely positive with a three-plus reaction. It would appear therefore that the trichophytin test is a valuable diagnostic aid in suppurative types of ringworm.

TREATMENT

Suppurative ringworm in Canada is a disease peculiar to those engaged in agricultural pursuits. In the present series of cases only two species of fungi were isolated, *i.e., T. gypseum* and *T. album.* The trichophytin reaction was consistently positive whenever attempted. A positive trichophytin reaction is generally accepted to indicate that the body is producing antibodies to inhibit or destroy the fungus. In time these antibodies will confer an active immunity on the host. Often this immunity is slow in developing. Such drastic treatments as strong ointments, injections of croton oil, intravenous therapy, and epilation with x-ray and thallium have been recommended to speed up the process and effect a cure. Many of these treatments set up such severe reactions as to produce much permanent scarring. The best form of treatment must be one that is readily available in rural districts and simple in its application. In this series the boracic acid starch poultice was used. Sir Norman Walker has suggested this as a useful measure in treating kerion. It is prepared as follows. Mix four tablespoonfuls of cold water starch with enough cold water to form a creamy mixture; then add one teaspoonful of boracic acid and mix; add a pint of boiling water rapidly and stir the mixture vigorously until the starch bursts and becomes a translucent jelly. When cold, the jelly is spread about half an inch thick between two layers of muslin and applied as a poultice, which should be changed every four hours. Twenty patients were treated by this method. The majority of these patients were treated in hospital. The starch poultices effectively removed infected crusts and hairs, giving free drainage to the underlying pus, the lesions became clean and deep red in colour, and the elevated masses subsided to the level of the surrounding tissue. The patients all showed improvement in from 2 to 4 weeks. At this stage patients were usually allowed to return home with instructions to continue treatment. Table IV gives the duration of treatment.

TABLE IV

DURATION OF TREATMENT WITH BORACIC ACID STARCH POULTICES

	Number of patients	*Number of days treated* — *Minimum*	*Average*	*Maximum*
Kerion	4	10	19	31
Sycosis parasitaria .	14	4	15	28
Agminate folliculitis	2	18	23	28

The rural origin of the patients prevented following the cases to completion and made it difficult to estimate the length of time required for a clinical cure. It is significant that no relapses have appeared in this series. The following 7 cases are given briefly because they were followed to completion.

CASE 1

No. 377. A boy on a farm, aged 4 years, was admitted to the Children's Hospital of Winnipeg on August 9, 1932, with a diagnosis of kerion of the scalp due to *Trichophyton (microides) gypseum.* The trichophytin reaction was three-plus. He was treated with starch poultices till August 22, 1932 (13 days), and was discharged from hospital much improved. He gave a history of uneventful recovery when seen a year and a half later. A partial cicatricial alopecia of the scalp remained.

CASE 2

No. 321. A stock yard employee, aged 34 years, was admitted to the Winnipeg General Hospital on March 2,1932, with a sycosis parasitaria due to *Trichophyton (megalosporon) album.* Trichophytin reaction was three-plus. He was treated with starch poultices for nine days, and was then discharged, with his beard very much better. He was completely cured when seen two months later.

CASE 3

No. 421. A farm-helper, aged 23 years, was admitted to the Winnipeg General Hospital on February 17, 1933, with a sycosis parasitaria due to *Trichophyton ectothrix megalosporon.* He was treated with starch poultices for two weeks and was then discharged improved. He was seen two months later and was clinically cured.

CASE 4

No. 459. A farmer, aged 34 years, was admitted to the Winnipeg General Hospital on July 18, 1933, with a sycosis parasitaria due to *Trichophyton ectothrix megalosporon.* The trichophytin reaction was four-plus He was treated with starch poultices for 10 days and discharged on July 28, 1933, with the beard lesions improved. On August 20, 1933, he wrote saying his ringworm was disappearing rapidly. A letter received February 2, 1934, said the lesions had disappeared, leaving a scar in one place on the beard.

CASE 5

No. 492. A farm helper, aged 23, was first seen January 11, 1932, suffering with a sycosis parasitaria of the right side of the jaw, and an agminate folliculitis of the left forearm, both of which were due to *Trichophyton*

(*megalosporon*) *album*. The trichophytin reaction was four plus. He was treated with starch poultices without admission to hospital. Both lesions were completely healed 26 days later.

CASE 6

No. 436. A farm-helper, aged 19 years, was admitted to the Winnipeg General Hospital on March 15, 1933, with a typical sycosis parasitaria. No spore chains were found on microscopical examination, the disease being probably too far advanced. He was treated with starch poultices for 18 days and discharged cured.

CASE 7

No. 516. A grain inspector, aged 45, was first seen on January 29, 1934, with an erythemato-nodular lesion on his left wrist. The lesion tended to scale, and a few small pustules were present. Microscopical examination of scales revealed *Trichophyton ectothrix megalosporon*. The trichophytin test was three-plus. Improvement was slow, and on February 15, 1934, boracic acid starch poultices were commenced. Eighteen days later the lesion had practically disappeared.

DISCUSSION

Three types of suppurative ringworm, common in Western Canada, are described in this paper: (1) kerion; (2) sycosis parasitaria; (3) agminate folliculitis.

It is suggested that they are essentially the same. The reasons for this are cited below.

1. The clinical pictures of the three types are very similar. Changes in the kind of lesion found may be attributed to the changes in topography.

2. The trichophytin reaction was always positive. This was not the case with the superficial forms of ringworm investigated.

3. Microscopical examination of specimens always revealed members of the genus Trichophyton. They were either *T. ectothrix megalosporon* or *T. ectothrix microides*.

4. Cultures, when obtainable, belonged consistently to two species: *T. album* and *T. gypseum*.

5. The three types of suppurative ringworm were all amenable to treatment with boracic acid starch poultices.

Thus we have three so-called separate diseases, all with similar clinical pictures, reacting in the same way to intradermal tests, revealing the same types of fungi on microscopical examination and culture, and cured by the same treatment.

SUMMARY

1. Forty-six cases of suppurative ringworm were studied in the Winnipeg Children's and Winnipeg General Hospitals.

2. The clinical types of suppurative ringworm are described under the following headings: (*a*) kerion; (*b*) sycosis parasitaria; and (*c*) agminate folliculitis.

3. The patients were all farmers or cattle dealers.

4. A pronounced seasonal incidence was noted with cases of sycosis parasitaria. The majority of cases appeared in the late winter months.

5. Microscopically, two types of fungi were obtained. They were *T. ectothrix megalosporon* and *T. ectothrix microides*.

6. On culture, *T. album* and *T. gypseum* were isolated.

7. The trichophytin reaction was positive on all the fifteen patients who were tested.

8. The boracic acid starch poultice was the method of treatment adopted for 20 patients. It yielded uniformly good results. Brief histories are given of 7 cases followed to completion.

EARLY HISTOLOGICAL DIAGNOSIS OF CARCINOMA OF THE UTERINE CERVIX.—H. Schmitz and E. L. Benjamin report an instance in which, ten months prior to a diagnosis of typical carcinoma, the microscopic examination of the cervix showed leukoplakia, atypia and neoplasia of the epithelial cells, a negligible amount of epithelial heterotopia and a stroma reaction. Such blastomatoid changes are apparently irreversible and should be considered as the earliest histological evidence of carcinoma of the uterine cervix. Such blastomatoid changes should be considered malignant. The authors believe that, if such cases are not treated adequately at the time of their detection, they should be kept under close clinical observation. If marked heterotopia and breaking through of the basement membrane have occurred, the patient should be immediately and adequately treated by surgery or radiation. It will become the duty of the physician and pathologist to subject all cervical tissues removed at operation to serial sectioning and the changes of neoplasia should be considered as the earliest histological evidence of carcinoma of the uterine cervix. The detection of early carcinomas of the cervix can be attained only by employing palpation and inspection of the genital organs as part of every physical examination. Linear cauterization of the vaginal portion of the cervix will cure chronic cervicitis. If the lesion does not heal, or if it recurs, low circular amputation of the diseased part of the portio vaginalis and microscopic examination of serial sections of all the tissues will lead to an early diagnosis of cancer.—*J. Am. M. Ass.*, 1934, **103**: 808.

ACUTE PANCREATIC NECROSIS*

(A REVIEW OF TWENTY CASES)

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THE purpose of this paper is to call attention to the occurrence of acute pancreatic necrosis, particularly with its relation to disease of the gall bladder, and to submit evidence that the condition is probably more common than has hitherto been supposed. The paper is based upon 20 cases which have been admitted to the Hamilton General Hospital and to St. Joseph's Hospital in the past five years. In each case the diagnosis has been confirmed either by laparotomy or by necropsy. Seven of these cases came directly under our care. Of the 20 patients 8 died, giving a mortality of 40 per cent. Post-mortem examinations were made in every case of death except one.

Over 30 years ago Opie[6] brought out his theory that acute pancreatic necrosis, or acute hæmorrhagic pancreatitis, was caused by a regurgitation of bile up the pancreatic duct activating the pancreatic ferments, and giving rise to autodigestion of the gland. His theory was based upon a case of acute pancreatic necrosis of Halstead's which came to autopsy, the post-mortem examination disclosing a small stone lodged in the ampulla of Vater in such a way as to render the common bile duct and pancreatic duct one continuous channel. Since that time a number of similar cases have been reported, and a considerable amount of laboratory investigation has been undertaken, which has tended to confirm, at least in part, Opie's work.

The classical case of acute pancreatic necrosis, with its agonizing pain, cyanosis, and general collapse, was conspicuous by its absence in our series. Although several patients had severe pain, in no case was it necessary to resort to a general anæsthetic to control it. As a matter of fact most of the cases were explored with a pre-operative diagnosis of acute or subacute cholecystitis, the attending surgeon not considering that they demanded immediate operation. Frequently 24 to 48 or even 72 hours elapsed from the time of admittance to hospital until operation.

Twice as many females were affected as compared with males, but the average age of each was the same, namely, 45. In half the cases gallstones were stated to be present, and in 5 others the gall bladder was drained, but the surgical note does not enlighten one as to the presence or otherwise of calculi.

PATHOLOGY

A discussion of the pathology of any given disease should include: (1) consideration of the infecting or exciting agent; (2) the path of invasion; (3) the clinical pathology; (4) the morbid anatomy, including the gross and microscopic lesions. Without a sound knowledge of the etiology employment of rational treatment is impossible, but it is exactly concerning the exciting agent and the route by which it reaches the pancreas that controversy arises.

It must occur to anyone that there are five possible routes for invasion of the pancreas: (1) by the blood stream; (2) by the lymph stream; (3) by direct extension, *e.g.*, from an ulcer of the duodenum or stomach perforating through to the pancreas; (4) by regurgitation up the pancreatic duct from the duodenum; (5) by the bile passages.

Blood stream infection with resulting pancreatitis cannot be denied, since acute pancreatic necrosis has been observed in the course of typhoid fever, influenza and mumps. After all, it is not altogether surprising that the virus of mumps circulating in the blood stream should attack another digestive gland of rather similar structure. Although septicæmias of various kinds do produce lesions in the pancreas, they scarcely ever resemble the striking picture of acute pancreatic necrosis.

The lymph stream has long been advocated by the late John B. Deaver[2] and others as the most likely pathway for the agent to enter the

* A paper read at the Annual Meeting of the Ontario Medical Association, June, 1933.

pancreas. This is based largely on the fact that the liver, bile ducts, and pancreas have a closely intermingled lymphatic connection. However, it must be remembered that cholecystitis does not always exist in association with pancreatic necrosis. Kaufmann[3] and others could not establish the lymph pathway as a likely route, and, after considerable laboratory investigation, conclude that infection *via* the lymphatics from an inflamed gall bladder, liver or bile duct is unlikely. I should like to add to these observations that in none of our series was the gall bladder very acutely inflamed.

The direct extension of some lesion such as a gastric or duodenal ulcer involving the pancreas and setting up acute necrosis is a possibility but one which becomes quite unlikely in considering the clinical and autopsy findings.

Regurgitation up the pancreatic duct from the duodenum offers some possibilities. It must be admitted that a parotitis may have its origin in an infected mouth and reach the parotid gland along Stenson's duct. There is then a possibility that an occasional case of pancreatic necrosis may have its origin in an enteritis or duodenitis and reach the gland by the pancreatic duct.

CASE 1

(No. 2374, S.J.H.) A female child, 4½ years of age, was admitted to the hospital with the history that on the previous day her baby brother had accidentally fallen against her abdomen. There was no immediate complaint until 36 hours afterward when the signs of an acute intra-abdominal lesion were apparent, and with a diagnosis of perforated appendicitis the abdomen was explored. A considerable amount of bloody fluid was found in the abdomen with multiple areas of fat necrosis and hæmorrhage into the pancreas, but with no evidence of injury to other viscera. The child made an uninterrupted recovery and left the hospital in three weeks.

Owing to its situation the pancreas is not particularly liable to injury, as it is one of the organs most remote from the anterior abdominal wall. Since, in the case of this child, no other intra-abdominal lesion could be found it seems just possible that the blow upon the abdominal wall was sufficient to raise the intra-abdominal pressure enough to cause a spurt of duodenal contents or of bile to regurgitate up the pancreatic duct and start the chain of events resulting in acute pancreatic necrosis.

While granting that all the pathways mentioned might be employed by the exciting agent, it must be admitted that lesions identical with acute pancreatic necrosis are produced, experimentally at least, by the injection of bile, particularly infected bile, into the pancreatic duct. In view of the constancy and regularity of the results most observers have suspected that bile regurgitating into the pancreatic duct and hence into the pancreas is a most important factor in the production of acute pancreatic necrosis. Considering, then, that bile when introduced by means of a cannula and syringe into the pancreas of the experimental animal causes lesions identical with acute pancreatic necrosis, it becomes necessary to show how the bile can be made to enter the pancreas physiologically. A study of our post-mortem material shows three types of variations in the termination of the common bile duct and the pancreatic duct. (See Figs. 1, 2, 3).

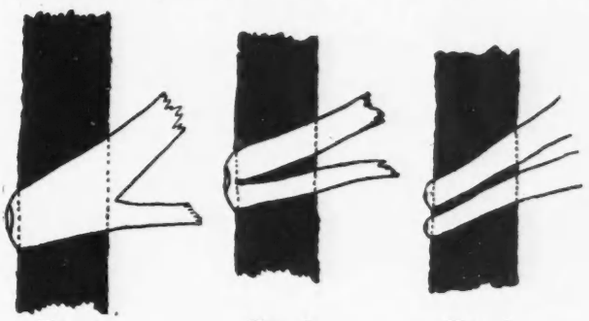

FIG. 1 FIG. 2 FIG. 3

FIG. 1.—In type 1 the pancreatic duct empties into the dilated portion of the common bile duct (ampulla of Vater) about 8 to 10 mm. from the apex.

FIG. 2.—In type 2 both ducts are contiguous and their extremities open into the ampulla 1 to 2 mm. from the apex.

FIG. 3.—In type 3 both ducts have a separate opening in the duodenum.

It is obvious that a gall stone of a certain size lodged in the ampulla might readily convert the two ducts into one continuous channel with resulting regurgitation of bile up the pancreatic duct, should the duct resemble type 1. On the other hand in type 2 a stone large enough to become impacted at the apex would also close the pancreatic duct and prevent the regurgitation of bile. In type 3 it does not seem possible for any size or type of stone to convert the ducts into a continuous channel and bring about regurgitation of bile into the pancreas.

Archibald[1] has shown that spasm of the sphincter of Oddi can be produced experimentally, explaining on that basis some cases of bile regurgitating up the duct. However, neither a stone lodging in the termination of the common bile duct nor spasm of the sphincter of Oddi can explain the cases which occur with a type 3 termination, *i.e.*, where the ducts empty

into the duodenum by separate openings. Two of our fatal cases showed this type of duct relationship at necropsy. In addition Mann and Giordano[5] have shown that it requires considerably higher pressures to force bile into the pancreas than exists in the experimental animal. One is forced to await further light upon the subject of the experimental production of pancreatic necrosis.

Reference may be made to the clinical pathology, briefly, by noting that in our cases the ordinary routine urinalysis revealed nothing of interest. The white blood cell count showed an elevation in every case except one, ranging from 15,000 to 20,000 per cubic millimetre, with an average of 16,500; the traumatic cases however showed counts of over 35,000. Additional laboratory tests were made infrequently.

Grossly, the pancreas is swollen, and the colour ranges from pink to deep red or purplish black. The head, body or tail may be involved, or the whole organ. Our necropsy specimens showed that in most cases the entire pancreas had progressed to suppuration or gangrene. The peritoneal cavity reveals curious, white, waxy-looking flecks, about 4 mm. in diameter, which have been shown to be areas of fat necrosis. Microscopically, the dark areas in the pancreas are found to be patches of necrotic tissue infiltrated with changed blood, and usually showing about the margins marked acute inflammatory reaction.

DIAGNOSIS

A consideration of these data brings up the question as to whether or not a correct diagnosis of acute pancreatic necrosis could have been made before operation, more frequently. Dr. Frederick Lewis,[4] of Toronto, in reviewing his experience with these cases made the observation that, clinically, the condition was very similar to attacks of acute biliary colic, but he pointed out the distinction that they were nearly always somewhat more severe than the usual run of cases. We should like to concur in what he has stated. On re-examining the clinical charts of these patients, there was in nearly every case a good history of gall stone colic; however in over half the cases the patient's general condition was more serious than is usually seen in ordinary gall bladder colic. For example, one patient had a pulse of 128 (H.G.H. 2196) on initial physical examination; one surgeon noted a "rapid thready pulse" (S.J.H. 911); another patient (H.G.H. 8040) had cyanosis of the finger nails and lips. Three others had temperatures below 96.5° (S.J.H. 326 and 1008; H.G.H. 2014), while in one case an initial temperature of 94° was recorded.

Presumably the average patient with gall stone colic is rendered fairly comfortable with one-quarter grain of morphine repeated once in a few hours. Two patients in this series continued to have some pain in spite of repeated hypodermic injections of morphine. We believe that if the patient is not made fairly comfortable with one-quarter of a grain of morphine, repeated in two to four hours, that some complication of cholecystitis exists, and an important complication is acute pancreatic necrosis. When one or more of the above features are present, and the surgeon finds the pain and tenderness localizing to a point slightly to the left of the mid line, just above the umbilicus, the diagnosis is fairly certain. In several of our own cases we have been able to feel some thickening in the epigastrium, but usually not until the patient is relaxed under anæsthesia.

TREATMENT

Modern-day surgery demands the simplest and most rapid operative procedure in the presence of acute intra-abdominal lesions, and employment of such measures in the treatment of acute pancreatic necrosis is highly desirable. The placing of drains trans-abdominally into a retroperitoneal organ such as the pancreas, thus converting an extra-peritoneal lesion into an intra-peritoneal one is highly undesirable. Not only is it undesirable, but attempts at drainage in this manner are futile. In this series where such drainage was attempted only a minimum of serous fluid was obtained. In those cases in which the pancreas was drained and which later came to necropsy it was plainly evident that the final result could not have been prevented by any number of drains. One has the impression that a rapidly performed cholecystostomy drains a likely source of original infection and may reduce tension in the pancreas. This drainage of the gall bladder adds but little to the time of the operation. Whether the gall bladder is drained or not, the fact remains that there were a number of patients in whom the pancreas was not drained

and yet who made a satisfactory convalescence, while a large number of undiagnosed cases of acute pancreatic necrosis undoubtedly recover without any operation.

The following case proves that these cases can recover without drainage.

CASE 2

(H.G.H. 3196). A female patient, aged 65 years, was admitted on January 6, 1934, with a history of repeated attacks of pain requiring morphine, diagnosed as biliary colic, and associated with a chronic gaseous type of indigestion. About eight hours before admission she was seized with a severe epigastric pain, with considerable nausea and vomiting. Physical examination showed the abdomen to be quite soft with tenderness, grade two on the basis of four, across the epigastrium. Pulse, 100; temperature, 99° F.; respirations, 20; urinalysis, essentially negative; white blood cell count, 21,000.

Under general anæsthesia an ill-defined mass extending across the epigastrium could be palpated. At operation, with a right rectus incision, on opening the peritoneal cavity a moderate amount of blood stained fluid was evacuated. There were a number of white flecks typical of pancreatic necrosis in the region of the head of the pancreas and at the base of the transverse mesocolon. Stones were palpated in the gall bladder. After simple exploration the abdomen was immediately closed in the regular way without drainage.

One week following operation the patient developed broncho-pneumonia with severe cough. Three weeks after her operation, evidently as the result of the coughing, the catgut stitches gave way, and some coils of intestine escaped through the wound, necessitating resuture of the incision. At the time of this second operation an opportunity was afforded to re-examine the abdomen. The swelling in the pancreas had disappeared, but the areas of fat necrosis could still be made out, although now of a pinkish colour. After exploration the abdomen was closed in layers, following which the patient's convalescence was uninterrupted so that she was able to leave the hospital eight weeks after admission.

Granted that the adoption of conservative principles is good surgery it follows that immediate operation is not required. Since many of these patients are in a state of shock and are quite dehydrated as the result of vomiting they are greatly in need of fluids. To restore the fluid balance large amounts of sodium chloride and glucose solution should be given intravenously. Morphine in generous doses to combat the pain will be required. Although we believe conservative treatment offers a lower mortality rate the surgeon must recognize the grave nature of the condition, and accept the fact that some cases are doomed to die in spite of any measures.

SUMMARY

1. A report of 20 cases of acute pancreatic necrosis is submitted.

2. The exciting agent is unknown, as is also the route it employs.

3. Infected bile or duodenal contents injected under pressure into the pancreatic duct of an experimental animal causes an acute necrosis of the pancreas closely resembling that seen in man.

4. As yet no satisfactory explanation has been offered in the cases where the common bile duct and pancreatic duct enter the duodenum separately.

5. Patients suffering from biliary colic who are not rendered relatively free from pain by the hypodermic administration of one-quarter of a grain of morphine, repeated in two to four hours, are probably suffering from some complication of gall-stone colic, and acute pancreatic necrosis is an important complication.

6. Although acute pancreatic necrosis carries a higher mortality (40 per cent in this series), there is reason to believe that it is probably not so high as has been hitherto supposed, because undoubtedly many patients who survive do not come to operation.

7. Often the diagnosis may be made before operation if the triad of symptoms and signs is kept in mind, *viz.*: (a) the patient's general condition more acute than is usually seen in biliary colic; (b) pain and tenderness localizing to the left of the mid line just above the umbilicus; (c) palpation of an indefinite thickening in the epigastrium, (often it is only palpable after the patient is relaxed under the anæsthetic).

8. As a prophylactic measure, removal of infected gall bladders would prevent many of these cases.

9. When a diagnosis of acute pancreatic necrosis is made, immediate surgical attack on the pancreas is not required.

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SPRENGEL'S DEFORMITY. FAILURE OF THE SCAPULA TO DESCEND

(WITH REPORT OF A CASE IN INFANCY)

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IN 1891, Sprengel[1] formulated a theory as to the causation of the rare anomaly to which his name is commonly attached in medical literature. However, it was originally described by Eulenberg[2] in 1863, and a few cases were reported in the literature preceding Sprengel's publication in which he explained its occurrence as due to abnormal posture of the fetus *in utero*, plus a deficiency of amniotic fluid. In 1880, Willet and Walsham[3] in England, and McBurney and Sands,[4] in the United States, described the first cases observed in their respective countries. Horwitz,[5] in the United States, and Fairbanks[6] and Greig,[7] in Britain, have been the outstanding contributors to the later literature on the subject.

Because this deformity becomes more obvious as the individual matures, and because impairment of function is then recognized by the patient himself as well as the examining physician, it is described more often in adults than in children. It may involve one or both scapulæ. The affected bone lies at a higher level than normal, and associated changes in axial rotation, shape, and size are usual.

In the embryo the scapula appears about the fifth week of intra-uterine life, lying between the fifth cervical and first dorsal vertebral spines. Normally, it gradually lengthens and descends to its position between the spines of the second and seventh dorsal vertebræ. A definite ratio between the breadth and length of the normal scapula exists. Based upon this fact, Broca determined the scapular index, derived from the formula $\frac{100 \times \text{breadth,}}{\text{length}}$ to be 65.9.

In Sprengel's deformity, the basic anatomical finding is the abnormal height of the affected scapula, which may vary from a half to four inches above its normal fellow. According to Greig and Horwitz, the left is most commonly involved. Occasionally, a bilateral case is reported (Laureati[8]). A constant finding is the rotation of the scapula in such a way that, instead of the vertebral border being almost parallel to the spinal column, the upper mesial angle will lie closer to the mid-line, and the inferior angle further away, *i.e.*, nearer the axilla. The bone changes observed in such an elevated scapula include exostoses and an increase in the acuteness of the angulation: "subscapular angle" being the term applied to the contour of the thoracic surface of the bone. The occasional presence of an omo-vertebral articulation is of embryological and surgical interest. This articulation may be a movable type, or, as more often occurs, a rigid bony bar connecting the apex of the spine of the scapula firmly to adjacent vertebral spines. The size and shape are both extremely variable. In one case reported by De Mowbray,[9] articular facets were present. The process extended from the root of the spine of the scapula to the seventh cervical spine. Ely[10] and Fisher[11] describe a bar in several of their cases. Mowbray quotes Shattock's observations that a similar process is found as a cartilaginous bar in a certain species of fish, the Dipnoi.

In regard to the abnormal changes found in the muscles, the trapezius is most often involved. Defects in muscle tissue and partial or complete absence have been described. Greig cites one case in which the right chondro-sternal portion of the pectoralis major was absent. Adjoining structures often show abnormalities, the cervical vertebræ and the ribs most frequently. Amongst the deformities described are fused or malformed ribs, cervical ribs, scoliosis, and congenital mal-development and fusion of cervical vertebræ, causing a short neck. In this latter group, the head appears to be riding on the shoulders. In Greig's report, cases of Sprengel's deformity are cited both with and without cervical vertebral malformations. Occurring alone, the vertebral defect is classified as the "Klippel-Feil syndrome".

Associated with the defects of Sprengel's deformity, Horwitz states that 15 per cent of the cases have some defects of the humerus or clavicle. Other congenital anomalies appear quite commonly in these patients; cleft palate, strabismus, situs inversus, congenital dislocation of the hip, valgus deformities, and spina bifida are reported. Bilateral congenital inguinal hernias, which is present in our case, is described but by one earlier author (Rager).

The classical case presents a fixed high position of the scapula, more frequently the left, associated with torticollis and inability to abduct the arm above the horizontal. Although present at birth, it often escapes attention until the individual seeks employment in which the dysfunction is a handicap. In plump infants it is particularly difficult to recognize. Only 2 of 18 cases reported by Fairbanks were recognized in infancy. Hoarseness, dull ache, and occasionally acute pain about the shoulder are rare symptoms.

Sprengel advanced the theory that the deformity resulted from abnormal intra-uterine pressure forcing and holding the arm backward. Birth-injury, defect of the trapezius, periostitis with exostoses, and muscle contractions are cited by other authors as possible etiological factors. Other theories which have been advanced are congenital arrest due to amniotic adhesions, and malformation of the scapula as part of a general mal-development. Rager, Chievitz, Rabel and several others believe that the defect is due to a failure in the normal descent of the scapula at the ninth week of intra-uterine life. The consensus of most recent authors favours this view.

In the differential diagnosis one has to consider abnormalities and diseases of the bone due to rickets, osteomalacia, cervical Pott's disease, badly united fractures of the scapula or clavicle, and rarer congenital defects of cervical vertebra including the Klippel-Feil syndrome. The past history and symptoms, with the addition of the information obtained from the x-ray, usually make the diagnosis.

Treatment is essentially surgical. Schrock[12] advocates wide radical surgery, and obtained good results in two cases. Exostoses and bony unions must be removed. Fisher describes the operation fully. After removing the bar of bone, he fixes the lower angle of the scapula to the spinous processes of the lower dorsal vertebræ. If bony articulation does not exist, and the deformity is slight, gymnastics and stretching methods are advocated. All authors advocate physiotherapy following operation. Even after radical surgery the functional and anatomical results are frequently unsatisfactory.

CASE REPORT

A male infant came under observation at the age of 7 months because of deformity of the left shoulder region. His birth was normal, full term, and spontane-

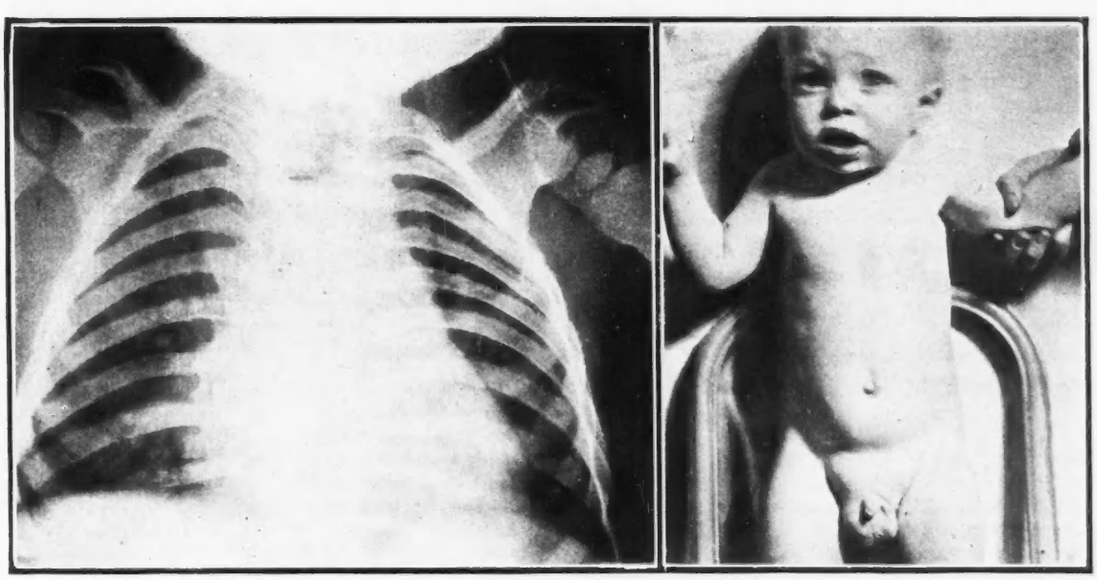

FIG. 1.—H.A., 14 months, showing osseous spicule and occiput, rotation of the glenoid fossæ, and enlarged thymus.

FIG. 2.—H.A., 14 months, showing bilateral inguinal hernias, shortness of neck, and the elevation of the left shoulder above the right.

ous. His parents were young, intelligent, and without apparent physical stigmata. The mother's Wassermann test was negative.

The patient was never breast-fed. At two weeks of age a bilateral complete inguinal hernia was observed. This infant had suffered no contagious illnesses, its mental and physical growth being quite normal. His weight at seven months was 15 pounds. The Wassermann test was negative. Examination at this time showed an elevated left scapula. The infant was quite plump and detail of the scapula was difficult to determine. The left arm could not be extended beyond a horizontal plane. No torticollis or scoliosis was evident.

Examination at 14 months showed a fully-developed white, male infant, weighing 20 pounds, who reacted normally to his environment. He could raise himself, stand alone, and he walked with help. The left arm was never raised above a horizontal plane. If an object was held above the head, even on the left side, the left hand was never used to grasp it. The head turned freely towards the right side, but the whole trunk had to be turned to view any object on the baby's left. The head could only to turned 45° to the left. There was no wry-neck. Flexion of the neck was complete, but extension was restricted to about 30°. With the infant sitting or lying down, the chin rested on the chest. The neck appeared quite short anteriorly, while posteriorly only a crease separated the occiput from the shoulders. The left scapula was 1¾ inches higher than the right. The distance from the mid-line to the superior mesial angle of the left scapula was ¼ of an inch; the distance on the right side was ¾ of an inch. The superior border of the left scapula was a finger's breadth from the occipital bone. About the middle of the superior border, a sharp process of bone, approximately an inch long, extended upward in contact with the occipital bone. The superior border of the right scapula was at least an inch below the occiput. The total length of each scapula was approximately 3 inches. Both inferior angles were the same distance from the mid-line. The position of the left scapula was so altered that the left gleno-humeral articulation lay more anteriorly than the right. The outer portions of both clavicles lay markedly more vertically than normal. There was a moderate rachitic rosary. No scoliosis or apparent spina bifida were present. Physical examination was otherwise essentially negative, except for large complete bilateral indirect inguinal herniæ. Both sacs contained intestine which was easily reduced.

The roentgenogram, taken by Dr. W. A. Gilmore, disclosed a congenital abnormality of the left shoulder region. The entire left scapula was rotated upward and outward away from the posterior thoracic wall, with the scapular spine running approximately parallel to the shadow of the rib angles in the posterior axillary line. The spinous processes of the second and third dorsal vertebræ were patulous, forming spina bifida occulta. The first and second ribs on the left side formed one rib, with the spinal articulations occupying about the same position as the spinal articulation of the second rib on the opposite side. This flattened the entire upper third of the thorax. The process of bone felt on the superior border of the left scapula appeared to be a prolongation of the scapular spine.

The thymus was enlarged.

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ANEURYSM OF THE AORTA WITH COMPRESSION OF THE SPINAL CORD*

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ALTHOUGH aneurysms of the aorta have been widely and frequently reported (over 5,000 cases in the literature up to 1924)[1] the complicating factor of compression of the spinal cord has been discussed by very few authors, in spite of the fact that the combined picture was reported as far back as 1841. Because of its rarity the following case is recorded.

M.C., 51 years old, a leather worker, was first seen in the Out-Patient Department of the Massachusetts General Hospital on July 17, 1930, at which time he complained of pain in the chest which had been present for one year, described as a dull, aching sensation under the sternum, radiating into both axillæ. At times it was very sharp, often causing him loss of sleep. The usual duration was about three to four hours at any one time. The pain seemed to be precipitated by eating heavy foods. The physical findings were not remarkable. The Wassermann reaction was negative and the Hinton weakly positive. After three months the symptoms disappeared until March 6, 1933, when the pain returned with more severity, now radiating to the right scapula. He also made an additional complaint of numbness of both legs, especially the left, with some difficulty in walking and slight bladder incontinence, all of which came on following the jumping of a puddle of water.

The patient was found to have a spastic, ataxic paraplegia, and was referred to the Nerve Clinic, where lumbar puncture was done which showed an initial pressure of 210 mm. of water, with no response to jugular compression. After the withdrawal of 5 c.c. of fluid the pressure fell to 70 mm.; after 10 c.c., to 30 mm. The fluid was xanthochromic. Cells: 22 lymphocytes; total protein 186 mg. per cent; Lange 0123333321, and the Wassermann reaction strongly positive. The blood

* From the Neurological Department of the Massachusetts General Hospital. Read before the Boston Society of Neurology and Psychiatry, December, 1933.

Wassermann test was weakly positive, and the Hinton moderately positive. Because of the above signs of activity the patient was given intense anti-luetic treatment of neosalvarsan, bismuth and iodides, in spite of spinal block. After two months of this treatment he stated that his legs were considerably stronger, although he had to use a cane. Incontinence had disappeared. The treatment was discontinued because of an arsenical dermatitis. Two weeks before admission his cane slipped into a crevice and gave him a jolt. From that time he noticed that his legs were much weaker and "jumpy", particularly the left. Five days before entry he developed rapidly progressive incontinence of urine and a feeling of tightness about the lower abdomen. The only additional history of significance given on coming into the hospital was the story of a primary sore at twenty-one years of age.

Physical examination revealed slightly irregular pupils, reacting poorly, but definitely, to light; a heart enlarged to the left, the base within normal limits; a blood pressure of 185/90; the aortic and pulmonic second sounds equal; no thrills; and a soft systolic and early diastolic murmur at the apex. Posteriorly, to the left of the fourth and fifth dorsal vertebræ there was a palpable pulsation over which the heart sounds were well

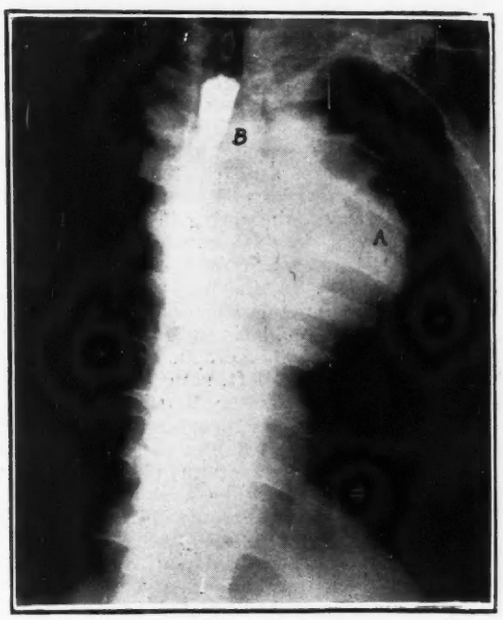

FIG. 1.—Intrathecal lipiodol demonstrating spinal block at the level of the fourth dorsal vertebra: A.—Aneurysmal sac. B.—Lipiodol arrest.

heard. No spinal tenderness was noted. The bladder was distended. Hypalgesia was present to the level of the ensiform process, and hyperæsthesia from the feet to the knees. Position-sense was markedly diminished, and vibration-sense as high as the anterior superior spines of the ilia was absent. The legs were spastic. The patient could perform all movements, but weakness was very apparent. The reflexes in the arms were very active. The abdominal reflexes were present, but weak. The knee-jerks were present, the left more active than the right. The ankle-jerks were absent and the plantar reflexes extensor in type.

Combined cisternal-lumbar puncture revealed a total block between the two needles. The lumbar fluid showed xanthochromia; the total protein was 236 mg. per cent; the colloidal gold curve tabetic in type, and the Wassermann test weakly positive. Lipiodol injected into the cistern stopped opposite the fourth dorsal vertebra (Fig. 1). X-ray films of the thorax and the spine showed a very large aneurysm of the descending aorta, just beyond the arch, measuring 14 by 17 cm., which had eroded halfway through the bodies of the 4th, 5th and 6th dorsal vertebræ, and partially destroying the ribs at their posterior attachments.

Surgical interference was deemed inadvisable, and the patient was discharged to a convalescent hospital, with the diagnosis of neurosyphilis and aneurysm of the aorta with compression of the spinal cord. From the convalescent hospital the patient returned home after three months, unimproved.

In reviewing the literature I could find only 11 reported cases not previously reviewed in the excellent work of Goldschmidt-Haas,[10] which is later analyzed in this paper.

The earliest was in the Société Anatomique,[2] 1841, in the form of an autopsy report of a case of progressive paraplegia with marked erosion of the 5th, 6th and 7th dorsal vertebræ by an aneurysm of the descending aorta. In this case the dura was adherent to the aneurysmal sac. On gross and microscopic examination the cord seemed intact.

In 1904 Andrieff, in a thesis at Toulouse, reported a case of destruction of the bodies of the 10th to 12th dorsal vertebræ in a case of flaccid paralysis. The cord was compressed, but the dura not ruptured. No microscopic findings were given.

The case of a negro, twenty-one years old, syphilitic, was described by Stow[3] in 1907. The symptoms were cough and paroxysmal pain in the chest of two years' duration. At post-mortem examination there was partial destruction of the first four dorsal vertebræ exposing the dura for a distance of 5 cm. Despite the exposure to aneurysm the cord was reported as grossly and microscopically negative.

Veillet-Triboulet-Boch whose patient with an irrelevant past history, gave a story of present illness dating back to 1922. At that time the patient had scapular pain. Physical examination was not remarkable. In 1923 the x-ray plates of the chest were negative. In 1924 with the appearance of dyspnœa, pain on pressure over the 8th to 10th dorsal vertebræ, and a Brown-Séquard syndrome occurred. X-ray pictures revealed an aneurysm filling the posterior inferior mediastinum. The patient died suddenly of hæmorrhage into the œsophagus. The autopsy revealed very marked destruction of the vertebræ with compression of the cord. No microscopic sections were made.

Taft's[4] case, diagnosed aneurysm with spinal caries by x-ray, following a period of cough, pain in the chest, dyspnœa and dysphagia, had no clinical signs of spinal cord involvement. Necropsy showed a huge sac, with an extensive zone of surrounding fibrosis involving all structures of the mediastinum and infiltrating the vertebræ, the fourth being a mere shell through which the finger was pushed with ease into the spinal canal. This gives an interesting illustration of the process prior to cord compression.

Many other cases of spinal destruction by encroachment of aneurysms are presented. In some the dura was exposed four to five cm., without any report of clinical manifestations of cord compression. Two French papers throw more light on the subject.

Devic and Janin[5] report a female, fifty-four years of age, with "stigmata of lues" and an otherwise irrelevant history, save for attacks of asthma for twenty years . In March, 1926, the patient had sharp pain at the base of the left thorax posteriorly, which disappeared spontaneously. In July, 1927, the pain returned, this time more severe and at the point of the left scapula. Two weeks later, a sudden attack of paresthesia in the legs followed, so that she had to be

assisted to her home, where she collapsed. Admitted to the hospital, the findings were consistent with a spastic paraplegia with a sensory level at the fourth dorsal segment. A diagnosis of cord compression was made. Lumbar puncture showed rose-tinged fluid with a few red cells, but no white cells, and a total protein of 90 mg. per cent. Lipiodol in the cistern was stopped completely at the level of the fourth dorsal vertebra. Laminectomy revealed that the bones were involved in a gummy material which was removed until a pulsating mass was seen. Following operation there was some improvement in movement of the legs, but none in sensation. There were two controlled hæmorrhages from the wound following operation. The patient died in one of her attacks of asthma. Post-mortem examination through the operative incision showed an intact dura and a cord that was not compressed. There was no gross blood in the subarachnoid space. In the epidural space there were, however, a number of fairly old clots and a perforation 3 cm. in length into the aneurysmal sac. The aneurysm extended from the aortic cusps to the pillars of the diaphragm with marked bony erosion and fibrous tissue formation involving the surrounding structures.

The second French paper, that of Hudelo,[6] describes the case of a proved luetic, fifty-nine years of age. Twenty years after an infection which was inadequately treated the patient noticed an expansile tumour in the left first interspace which remained stationary. After stumbling over a stone, she noticed progressive weakness of the left leg. On applying for treatment she was found to have spasticity of the legs, with no sensory impairment. Cerebrospinal fluid: Wassermann reaction positive; colloidal gold curve of tabetic type; lymphocytes present but not counted; total protein 2 grm. per litre. Ten hours following an arsphenamine injection the patient developed a left facial paralysis of the peripheral type, and a flaccid paralysis of the lower extremities, with retention of urine. Shortly thereafter she died. Extradural clots compressing the cord to one side, total block, and destruction of the fourth dorsal vertebra were found. The aorta showed two aneurysms, one on the anterior arch, the other on the descending aorta, causing spinal column involvement. Histological sections above the block were normal. At the block the meningeal vessels were congested, but not thickened. The meninges were neither thickened nor adherent. The white matter showed interstitial œdema. The grey matter of the anterior horns showed patches of degenerated nerve cells, mostly on the right side. The ependymal canal was dilated and surrounded by inflammatory exudate. An occasional thickened vessel was seen.

Sternberg[7] reported two cases.

The first, a 60-year old labourer, was in apparently good health until three years prior to admission. No history of venereal disease was obtained. In 1927 his first symptoms appeared in the form of heart attacks with dyspnœa, palpitation and a feeling of anxiety. By October, 1928, these had disappeared, and he was again in good health. At this time he had weakness and pain in the legs for one day. The Wassermann reaction of the blood was found to be positive and treatment with bismuth was initiated. At Christmas, the same year, the patient was taken with sudden onset of paralysis of the legs, with urinary incontinence. Examination revealed the heart to be enlarged, with a wide base, a systolic murmur over the sternum, a ringing aortic second sound, and signs of bronchitis. The spine was not tender on pressure. The pupils were dilated, the left more so than the right, with the reaction to light sluggish. The arms were normal, except for very active reflexes. In the legs the findings were consistent with a spastic paraplegia. At the level of the seventh and eighth dorsal segments there was a band of hyperæsthesia, below which there was a loss of all types of sensation. Lumbar puncture showed normal fluid pressure; the Wassermann test questionably positive; Pandy's test weakly positive; colloidal gold curve, 4322200000. One month later the patient developed a kyphosis over the fifth to eighth dorsal vertebræ which was sensitive to pressure. X-ray pictures demonstrated an aneurysm with extensive destruction to the same vertebræ. At autopsy complete destruction of dorsal segments five to nine was found, the aneurysm having invaded the canal, causing a complete section of the cord by pressure. No evidence of hæmorrhage was seen. Histological sections were not finished at the time of publication.

The second case was that of a 50-year old labourer, who in 1926, thirty-two years following his primary infection, developed pain beneath the sternum with attacks of dyspnœa. Three years later he had sudden onset of pain and weakness in the legs. Two weeks after the onset there was sudden collapse of the legs, on which he never walked again. The physical findings were enlarged heart with dyspnœa and cyanosis, (no widening of the base), a basal diastolic murmur, and an accentuated aortic second sound. The arms were normal, with the exception of very active reflexes. Paraplegia was complete and spastic, with absolute loss of all sensation below the level of the seventh and sixth dorsal segments, right and left respectively. There was pressure pain over the fifth to the eighth dorsal spinous processes. A lumbar puncture was not done, because of the poor condition of the patient. An aneurysm eroding the bodies of the fifth and sixth dorsal vertebræ was shown by x-ray examination. With the exception of the level the autopsy findings were identical with those of the preceding case.

Stengel[8] cites the case of a midwife who twenty years after a primary sore on the finger developed interscapular pain which became progressively worse over a period of two years, culminating in attacks of cardiac decompensation with marked substernal pain. After such an attack she noticed gradual onset of weakness in the legs, and in eight months was unable to walk and had difficulty with micturition and defæcation. On admission the patient could sit up only with assistance. The physical findings were normal, with the exception of a broadened aorta to the left, paravertebral dullness at the level of the bodies of the fourth to sixth dorsal vertebræ, through which the heart sounds were heard. There was pressure tenderness over the dorsal column in this region. Paralysis of the legs of the spastic type was present, with a sensory level at the third dorsal segment. The other findings were: spinal fluid, normal in all respects, (no pressure readings given); lipiodol, complete block at the fourth dorsal vertebra; x-rays, spine markedly eroded by an aneurysm. After four weeks of bismuth, arsenic and iodides there was a transient improvement. The patient could walk with a little help and sphincter trouble improved markedly. In a short time there was a relapse to her previous state. The autopsy findings were not reported.

Ayer's[9] patient, a tabetic, had a gradual onset of paraplegia with numbness, and premonitory symptoms only of pain in the back. On physical examination a heart of normal size was found, with the aortic sound accentuated, but no murmurs were present. There was an expansile tumour medial to the left scapula when the arms were folded over the chest. The paralysis in this case was flaccid, with all reflexes absent. Sensation to touch was diminished from the level of the nipples. At autopsy the aneurysm was found at the upper part of the descending aorta invading the first to fourth dorsal vertebræ, and extending into the spinal canal, causing an hour glass constriction of the cord with adhesions of the coverings. The microscopic sections showed marked loss of myelin in the posterior columns above and below the lesion, as would be expected in a known tabetic. Marchi-stained sections demonstrated above the compression degeneration of Gowers' and the direct cerebellar tracts; below the block pyramidal tract destruction; and at the site of constriction uniformly distributed atrophy. This is one of the two cases in which stained sections are reported on.

A dissertation on aortic aneurysms by Goldschmidt-Haas[10] in 1913 covered very thoroughly the literature to that time. Among his patients were 26 who had paraplegia. The histories were roughly similar to those of the above cases. Of these cases 16 were characterized by a gradual onset of spinal cord symptoms, the remainder having had a very rapid progression of the paraplegia. In 19 cases there were symptoms of aneurysm prior to the appearance of any central nervous system involvement. Four patients had spinal deformity, either kyphosis or scoliosis, and 5 had visible, pulsating tumours. In this series there were four abdominal aneurysms and four on the arch of the aorta, the remaining ones having been located on the descending thoracic portion. The post-mortem examination of the spinal cord varied greatly, as in the preceding cases. Grossly, 6 were normal, 8 were compressed by the aneurysmal sac, but not destroyed, and 5 demonstrated definite softening due to compression. The remaining 7 had extradural hæmorrhage as the cause of the cord deformity. In the last group all were noted to have had a rapid onset of paraplegia.

DISCUSSION

Considering the number of aortic aneurysms reported, the occurrence of spinal cord compression in such cases is extremely rare. Turnbull[11] in 6,829 autopsies found 175 aneurysms of the thoracic aorta, none of which invaded the spinal canal. The figures of Boyd[1] are even more striking. In his review of 4,000 post-mortem examinations of aortic aneurysms there were only 4 in which the spinal cord was affected, or one-tenth of 1 per cent.

In the literature I have found 38 cases to date. The location of the aneurysm in 29 of these was in the descending portion of the thoracic aorta. Of the remainder there was 1 at the ascending loop, 4 at the arch, and 4 in the abdominal part of the artery. In every instance there was erosion into the vertebral canal, and in many cases destruction of the posterior attachments of the ribs, which readily explains the frequent occurrence of radiating pain. The bony structure was markedly weakened.

Remembering the shell-like structure of the bone in Taft's[4] case, it is easy to picture how a paraplegia might ensue. A slight jolt might easily cause a crumbling of the shell, allowing the aneurysm to come in direct contact with the cord; or, likewise, a sudden release of pressure by the same mechanism might lead to rupture of the sac, with epidural hæmorrhage. The result without doubt would be a rapid onset of paraplegia. An acute kyphosis with a pinching-off of the canal and its contents is potentially another end-result of such a process. Again, it is not difficult to realize that with such a basket-like construction of bone, the aneurysmal sac, with repeated insults of pressure, would find its way to the spinal canal, with a gradual onset of symptoms.

The condition of the meninges and the spinal cord was very interesting. In some cases the dura was intact and in others it was markedly adherent to the wall of the aneurysm; but in no instance was it ruptured. The degree of damage in the cord itself varied greatly. Of the 38 cases there were 9 in which no gross defects were found; 10 demonstrated compression without softening; and 8 had microscopic evidence of degeneration; in 1 there was no note. In 10 instances the compression was caused by epidural hæmorrhage.

In the case of Devic and Janin[5] a three-centimetre opening leading from an epidural clot into the aneurysmal sac was reported. It would hardly seem possible that such a rupture would occur without death, or at least very marked shock, even though the rupture were into a closed cavity. A more plausible explanation is that the aneurysm, already adherent to the dura, became dissecting in type, and that in cutting through the dura to expose the epidural clot an entry was made into the dissecting sac, the three-centimetre opening being the connecting passage between the two parts of the aneurysm. On the other hand, epidural bleeding in such cases may be due to oozing, as in other types of aneurysm. Unfortunately in the pathological reports no definite connection between the extradural blood and the aneurysmal sac was established.

Microscopic sections of the spinal cord were reported in only 3 cases, those of Ayer, Hudelo and Goldschmidt-Haas, all of which demonstrated, along with the degeneration of compression, some evidence of a pathological process consistent with neurosyphilis.

As regards the diagnosis, there is little to distinguish paraplegia caused by aortic aneurysm from other types of paraplegia, save for the

presence of pulsating tumours, which were present in 5 of the recorded cases. The diagnosis of the condition is primarily that of aneurysm. It is strange, however, that most of the identifications were made with the aid of roentgenology or through the presence of pulsating tumours when 28 of 38 cases had definite symptoms of aneurysm before the onset of paralysis. Eight of the 11 reported since 1919 had cardiac anomalies, some discovered by examination of the dorsal region, which is quite reasonable, considering that the aneurysms are in the majority of cases on the descending portion of the thoracic aorta.

The cerebrospinal fluid analyses in this series were neither fully nor consistently reported. Where epidural hæmorrhage was found the fluid was tinted with blood. The total protein and cell counts varied from normal to slightly abnormal. Hydrodynamics were not recorded. It is sufficient to say that in a number of cases the fluid findings did not indicate more than a partial block (chemically estimated), from which it may be concluded that they do not always confirm a diagnosis of spinal cord compression. This was particularly well demonstrated in Stengel's[8] patient with marked paraplegia and definite sensory level, in whom the fluid was reported as normal in all respects.

Antiluetic treatment has been consistently unsuccessful in cases of aneurysm with cord compression. In those where improvement has been noticed it has been but transient. It hardly seems plausible that this form of treatment *per se* would be of any value where such marked bone destruction is found. An added factor of bed rest would be of twofold value. By this means the chance of strain on the markedly weakened bone would be minimized. Moreover, the patient would be afforded the best possibility to regenerate bony tissue, should the progress of the aneurysm be checked by medication.

SUMMARY

This paper presents:

1. A clinical report of aneurysm of the thoracic aorta, with evidence of spinal cord compression, both clinical and serological, in which no benefit was derived from treatment.

2. A review of the literature of 38 cases, some of which are abstracted.

3. An analysis of the clinical and pathological findings, with some suggestions as to diagnosis and treatment.

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BREATHING EXERCISES IN THE TREATMENT OF HYPERTENSION.—L. G. Tirala finds that a reduction in systolic blood pressure, which is notoriously difficult to bring about by drug treatment, can nearly always be secured—even to the extent of 50 to 100 mm.—in hypertonic subjects who are made to do deep breathing exercises for five minutes three times a day for three or four weeks. The reduction in pressure is maintained if the exercises are persevered with afterwards. The diastolic pressure also is reduced, but to a less extent. The patient is taught to take deep slow breaths of a predominantly abdominal type (''as if to burst a girdle round the belly'') followed by slow expirations during which an ''oo'' sound is hummed through the closed mouth. Training increases the length of expirations from ten to thirty seconds or more. The exercises are done in the first place in the recumbent position in those with very high pressures. As an adjuvant measure it is sought to lower the diaphragm by clearing the bowel of gaseous and other contents by administration of saline aperients and animal charcoal. The subjective symptoms accompanying hyperpiesis disappear, it is stated, as the pressure drops. Tirala does not hesitate to prescribe breathing exercises in hypertonics in whom morbid organic cardiovascular conditions have become established. The good effects are attributed to (1) increase of the left ventricular output, with reflex vaso-dilatation from stimulation of the aortic depressor nerve; (2) production of a relative alkalosis; and (3) a diminution of tone in the vaso-constrictor centre. Early in the course of treatment the blood pressure sometimes shows a temporary increase.—Abs. in *Brit. M. J.*

THE RELATIONSHIP OF THE SEDIMENTATION RATE IN RHEUMATIC INFECTION IN CHILDHOOD TO ALTERATION IN THE ALBUMIN-GLOBULIN RATIO*

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A YEAR ago we presented certain observations on "Rheumatic infection in childhood",[1] particularly concerning evidence of activity of the disease, from which we drew certain conclusions, namely: First, that the sedimentation rate of the red blood cells is markedly increased in the presence of acute rheumatic fever and tends to subside comparatively rapidly with the subsidence of the disease; secondly, that uncomplicated chorea shows no alteration in the sedimentation rate or leucocyte count; thirdly, that rheumatic fever or chorea, with associated carditis, shows a high sedimentation rate which takes months to return to normal, and hence this is probably the most delicate test of activity of the rheumatic infection; and fourthly, that in the presence of cardiac failure with œdema the sedimentation rate falls to levels below the normal, and is of grave prognostic import. Continued observations during the past year have given support to all these conclusions. We also suggested in our paper of a year ago that rheumatic nodules occurred during the subsidence of the infection and were not, contrary to our previous belief, of serious prognostic import. Confirmation of this belief we have had repeatedly this past year.

Our observations, reported in the present paper, concern the albumin-globulin ratios of the blood protein, which we have found to be consistently altered in the presence of increase in the sedimentation rate.

In a rather extensive study of the clinical value of the estimation of the protein fractions in the blood plasma, Johansen[2] found the albumin-globulin ratio altered by various diseased conditions in a manner corresponding strikingly to the sedimentation rate. Repeated examinations showed that increased sedimentation rate is associated with an increase in the fibrinogen and euglobulin fraction of the plasma. Only in cases of marked reduction in number of red cells or hydræmia did he obtain conflicting values.

METHOD

The method we have used for the estimation of the albumin-globulin ratios is a combination of: (1) Howes-Kjeldahl (*Biol. Chem.*, 1921, **48**: 109); (2) VanSlyke (*Biol. Chem.*, 1920, **41**: 587).

Solutions used.—(1) Twenty per cent $K_2C_2O_4$ (neutral potassium oxalate). (2) Sodium chloride 0.8 per cent. (3) Calcium chloride, *anhydrous*, 2.5 per cent. (4) Sodium sulphate, *anhydrous*, 22.5 per cent. To be kept in incubator to 38°C. to prevent crystallization.

Routine.—Collect blood as follows. In a test tube marked at the 10 c.c. level, place 0.25 c.c. of 20 per cent $K_2C_2O_4$. Dilute with blood to the 10 c.c. mark. (Note: Wanted 5 mg. $K_2C_2O_4$ for each c.c. of blood). Mix well by inverting the tube several times. Avoid shaking in order not to rupture the cells. Centrifuge and collect the plasma.

Test.—(A) Place 1 c.c. of plasma in the chloride tube. Add 30 c.c. of 0.8 per cent sodium chloride. Add 1 c.c. of 2.5 per cent calcium chloride. Invert several times and let stand until completely congealed. Break up the clot with a glass rod and filter.

Determine the N content (by Kjeldahl method) with 10 c.c. of the filtrate.

Calc.: 0.56 x c.c. N/50 used = per cent protein as (albumin+globulin).

(B) Place 1 c.c. of plasma in a test tube marked at the 20 c.c. level. Dilute to the mark with 22.5 per cent sodium sulphate. Mix well by inverting the tube repeatedly. Avoid frothing. Place in an incubator at 38°C. for three hours or more. Filter several times through the same filter paper.

Determine N content (by Kjeldahl method) with 5 c.c. of the filtrate.

Calc.: 0.7 x c.c. N/50 used = per cent protein as (fibrogen+albumin).

(C) Place 1 c.c. of plasma in a test tube marked at the 20 c.c. level. Dilute to the mark with 0.8 per cent sodium chloride. Mix well by inverting the tube repeatedly. Avoid frothing.

Determine N content (by Kjeldahl method) with 5 c.c. of the filtrate.

Calc.: 0.7 x c.c. N/50 used = per cent total protein.

Calc.: C-A = Fibrogen = X
C-B = Globulin = Y
A = Globulin + Albumin
C + (X - Y) = Albumin.

$$\text{Albumin} \div \text{Globulin ratio} = \frac{\text{Alb.}}{\text{Glob.}} = \frac{Z}{Y}$$

* From the Medical Service of the Children's Memorial Hospital, Montreal.

Read before the Canadian Society for the Study of Diseases of Children, June, 1934.

In all the Charts reproduced here the sedimentation rate in m.m. per hour is indicated by dots. The first solid line indicates the temperature, the second the total protein of the blood plasma, the third, the albumin, and the fourth, the globulin. Chart I, first, in chorea uncomplicated by carditis, where the sedimentation rate is consistently normal, there is no noteworthy alteration in the albumin-globulin ratio, as one would expect. In acute rheumatic fever, where the sedimentation rate is high, there tends to be quite a marked alteration in the ratio, in that the albumin is decreased and the globulin increased.

In acute rheumatic fever or chorea, with complicating carditis, where the sedimentation rate is increased, there is a very marked alteration in the albumin-globulin ratio. In fact this ratio may be so altered as to be inverted, as we are accustomed to find in nephrosis. During the course of the subsidence of the disease, however, these values tend to return to normal, as is shown in the charts. In the presence of cardiac failure with œdema, where the sedimentation rate falls to levels below the normal, this reversal may or may not hold true. The reason for this inconsistency is not apparent.

From our present knowledge it would appear that alterations in the sedimentation rate are dependent on more than one factor, one of which is here discussed. Another factor, which we had hoped to investigate, but owing to technical difficulties found impossible, is the factor of surface tension of the blood. We are aware that corpuscle volume, hæmoglobin concentration, and hydræmia are factors affecting the sedimentation rate. These observations on the albumin-globulin ratios are an investigation of one of these factors.

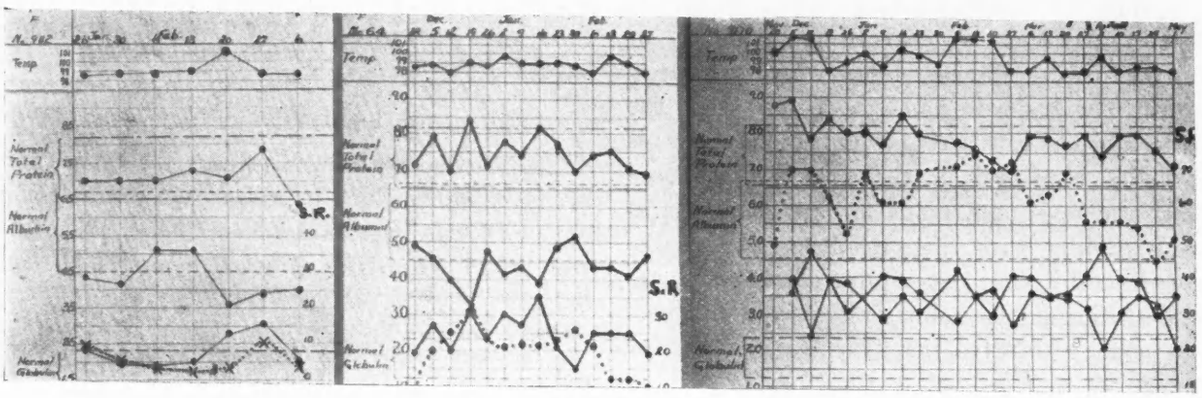

CHART I.—G., female, aged 3 years. Chorea without carditis. Temperature, total protein, albumin, globulin, and sedimentation rate were normal. Changes evident with superimposed infection —varicella.

CHART II. — M., female, aged 11 years. A case of subsiding rheumatic fever and carditis. With the improvement of the patient, the total protein and sedimentation rate returns to normal. The albumin rises, and the globulin falls to normal. Note: at the highest level of the S.R. the A-G ratio tends toward inversion.

CHART III.—M., female, aged 14 years. This indicates a variation of Chart II in the acute stage. Admitted in October, 1933. Third attack of acute rheumatic fever with pancarditis and decompensation. Sedimentation persists at a high level with constant alteration of albumin-globulin ratio.

CONCLUSIONS

Alterations in the sedimentation rate which have been shown to occur associated with rheumatic infection in childhood are associated with definite alterations in the albumin-globulin ratio. With a rise of the sedimentation rate, there is a drop in the concentration of albumin, and a rise in the concentration of globulin, and vice versa.

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SENSITIZATION TO ADHESIVE PLASTER.—Van Cleve records 2 cases, in a man aged 52 and a woman aged 26, in which application of adhesive plaster was followed by severe vesiculo-pustular dermatitis. As a result of patch tests the etiological agent was found to be orris root, which is the constituent of most commercial adhesive plasters. The writer maintains that a more general use of the patch test would show that many cases of eruption following the use of adhesive plaster would fall into the group of sensitization dermatitis.—*Urol. & Cut. Rev.*, 1934, p. 439.

METHODS OF TREATING PERSISTENT PYELITIS IN CHILDREN*

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INFECTION in the urinary tract, the so-called "pyelitis", is a very common disease in children, both in its acute and its chronic forms. The majority of acute cases yield rather readily to the usual treatment by means of alkalis and fluids. There are a number of cases, however, in which the infection persists in spite of vigorous treatment. This is frequently due to obstruction in the urinary tract at some point, but may occur without demonstrable obstruction. It is well known that the former cases are difficult to treat and become problems for the genito-urinary surgeon. Those without obstruction, however, can sometimes be successfully cleared up by purely medical methods. During the past few years, Helmholz,[1] at the Mayo Clinic, has found that large doses of methenamine and ammonium chloride are useful in treating such cases. The treatment is controlled by repeated cultures of the urine, as absence of pus from the latter is not always a reliable index of the absence of infection in the urinary tract. The organism most commonly found on culture is the colon bacilli, but staphylococci and streptococci occur at times.

Methenamine has, of course, long been used as an urinary antiseptic, and its action is due to the production of formalin in an acid medium. Helmholz has noted that its sterilizing action on the urine occurs only when the reaction of the latter is at a pH of 5.5 or below. To produce this degree of urinary acidity ammonium chloride is useful and may be administered in large amounts, *e.g.*, 120 grains daily to a child of six years of age.

A satisfactory method of treatment is as follows. A urine culture is first obtained and the type of organism determined. Fluid is then given up to 1,000 c.c. daily with ammonium chloride in amounts from 9 grains (0.6 grm.) to 45 grains (3 grm.) in divided doses until the urine is sufficiently acid. The pH of the urine may be tested by the use of methyl red paper which changes from yellow to pink at a pH of approximately 5.5. This paper is made by dipping filter paper in a 0.05 per cent solution of methyl red, and drying. When this point is reached methenamine is given with the ammonium chloride in amounts from 6 grains (0.39 grm.) to 22.5 grains (1.5 grm.).* After three or four days the urine is cultured, and if the specimen is sterile the medication is discontinued. Following this, two, or preferably three, consecutive sterile cultures are obtained before considering the infection as overcome. If the culture is not sterile the medication is increased until it becomes so, or until frequency and sometimes hæmaturia occur. It is occasionally necessary to carry the treatment to this point to sterilize the urine. The frequency and hæmaturia are the result of bladder irritation, and clear up rapidly when the medication is discontinued and alkalis given. In order to shorten the period of treatment ammonium chloride and methenamine may be given together from the commencement.

The following cases, treated at the Children's Memorial Hospital, indicate the results that may be expected in persistent pyelitis.

CASE 1

J.M., a girl of six years, was admitted to hospital on October 11, 1932, with elevation of temperature, pain in the back, frequency and nocturia. She had previously had measles, scarlet fever, and chicken-pox, but was well at the onset of the pyelitis. The latter began on July 18, 1932, with chills, a temperature of 104°, nausea, vomiting, and frequency. The urine was reported "milky with pus". The fever persisted and the child was in bed for six weeks. She then seemed much better, but had a continuous temperature of approximately 100°. Examination showed her to be well nourished and apparently not ill. There was slight puffiness of the eyelids, caries of the teeth, and the tonsils were small and buried. The temperature was 100°. Roentgenography of the kidneys, ureters, and bladder was negative. The red blood cells were 4,836,000; white blood cells, 8,800 with a normal differential count; hæmoglobin, 85 per cent. The urine showed 30 to 50 pus cells per high power field (uncentrifuged), and a urine culture showed over 1,000 colonies of colon bacilli in 0.5 c.c. of urine.

* A paper read at the Montreal Medico-Chirurgical Society on May 14, 1934.

From the Children's Memorial Hospital, Montreal.

* Helmholz[2] has recently stated that "with a very acid urine, one or two grains of methenamine may be sufficient to sterilize the urine. This result is not obtained with a urine of pH 5.1 or above.

She was given ammonium chloride, 45 grains, and methenamine, 22.5 grains, daily in divided doses for three days. During this time the temperature fell to normal and remained so. Two days after the medication was discontinued the urine culture was negative and only three pus cells per high power field were observed. Two further cultures were negative and the patient was discharged. One week later the culture was again negative, and when she returned, five months later, for observation, the urine was still sterile and she had no symptoms.

CASE 2

N. M., a girl of six years, was admitted to the hospital because of pain on urination which had been present for three weeks. There was no history of chills or of the sudden onset of symptoms. Pus had been present in the urine and she had been given alkalis without any change in the urine. Examination showed her temperature to be 101.3°, but physical examination was otherwise negative except for internal strabismus of the right eye. The red blood cells were 3,200,000; white blood cells, 18,000; hæmoglobin, 60 per cent. The urine showed 10 pus cells per high power field (uncentrifuged) and a culture showed innumerable colonies of colon bacilli in 0.5 c.c. of urine. She was given ammonium chloride, 90 grains, and methenamine, 45 grains, daily for three days in divided doses. At the end of this period the urine was sterile, but on discontinuing the medication colon bacilli again appeared. She was then given ammonium chloride, 120 grains, and methenamine, 45 grains daily, in divided doses for three days. Two and four days after discontinuing this treatment the urine was sterile and the patient was discharged. She was re-admitted a week later, as the culture of the urine was again positive. At this time a roentgenogram after the injection of uroselectan showed incomplete filling of the middle calyces of the right kidney, with narrowing and bending of the right ureter. Ammonium chloride, grains 120, and methenamine, grains 45, were again administered daily for four days. Three days and four days after discontinuing this treatment the urine was sterile and no pus cells could be seen. A few days after discharge from the hospital the urine was still sterile. Six months later a culture of the urine was again negative.

CASE 3

V.B., a girl of five years, was admitted to the hospital because of an acute upper respiratory infection with a convulsion. She had previously had several attacks of fever and pus in the urine. On admission, she had acute tonsillitis and acute right otitis media. The red blood cells were 4,420,000; white blood cells, 19,800; hæmoglobin, 70 per cent. There were only four or five pus cells per high power field in the urine, but the culture showed innumerable colonies of *B. coli* in 0.5 c.c. urine. Not until six days after admission did pus appear in the urine in quantity, and during this time the child's temperature was between 101° and 104° F. While the fever persisted she was given alkalis and fluids, but the urine culture remained positive. She was then given 60 grains of ammonium chloride and 30 grains of methenamine daily in divided doses, for four days. The urine became sterile, but on discontinuing the medication the culture again became positive. She was then given 100 grains of ammonium chloride and 37.5 grains of methenamine daily; increased on the third day to 150 grains of ammonium chloride and 75 grains of methenamine. On the third day of this treatment she complained of pain in the hypogastrium on voiding. The urine showed no red blood cells and the culture was negative. The medication was at once discontinued and alkalis given. The pain persisted for three days, and on the third day large numbers of red blood cells appeared in the urine. The hæmaturia persisted for 10 days to two weeks, until at the end of that time, no red blood cells were found in the urine. The urine culture remained negative.

This case illustrates well that irritation may be obtained with large amounts of methenamine. However, the symptoms of pain and hæmaturia do not persist, and the urine may sometimes be rendered sterile only when this point is reached.

In 1931 Helmholz and Clark[3] suggested another form of treatment for certain cases. This consisted in the administration of a ketogenic or high fat diet for a period of one to three weeks. By this means the pH of the urine can be lowered to a point below 5.5 and the urine will inhibit the growth of the colon bacillus. To do this satisfactorily apparently two conditions must be fulfilled; the urine must have a pH below 5.5 and must contain diacetic acid. In order to do this, ammonium chloride may have to be administered with the diet. Helmholz reported the successful treatment of two cases in which obstruction to the outflow of the urine occurred, and in which the urine could not be made sterile in any other way. Rennie[4] reported 6 cases with permanent cure in 2, relapse in 3, and no effect in 1.

The administration of a ketogenic diet requires care in the calculation of the diet and its composition. Ketosis is gradually induced over a period of several days, until there is a large amount of diacetic acid in the urine. The diet must be a weighed diet, and is calculated as follows. One gram of protein and approximately 50 calories per kilogram of body weight are prescribed. The diet for the first day contains a moderate amount of carbohydrates, one gram of protein per kilogram of body weight, and enough fat to make up the required calories. The carbohydrate is reduced each day and the fat raised until the desired degree of ketosis is produced. Occasionally, nausea and vomiting occur while the child is becoming accustomed to the diet. The giving of small amounts of orange juice obviates this difficulty, and the diet can be continued without interruption. The following is an example of a ketogenic diet prescription for a child weighing 20 kilograms, a 1,000-calorie diet.

Day	*Carbohydrate*	*Protein*	*Fat*
1st	50 grm.	20 grm.	80 grm.
2nd	35 "	20 "	87 "
3rd	20 "	20 "	94 "
4th	15 "	20 "	96 "
5th	10 "	20 "	98 "

After the fourth or fifth day ketosis is generally well established, and the diet is continued until the urine is sterile, a period of a few days to

two weeks. The following cases will illustrate the method and the results.

CASE 4

M.B., a girl 2½ years of age, was admitted to the hospital on June 28, 1933, because of fever and convulsion. During the previous summer she had had persistent pyelitis for three months. This had evidently cleared up completely, as a urine culture in November, 1932, was negative. A few hours before admission the child developed fever with abdominal pain, dysuria, and a slight convulsion. Physical examination showed little except slightly enlarged cervical glands, and some tenderness in both flanks. The red blood cells were 3,521,000; white blood cells, 9,400; hæmoglobin, 80 per cent. The urine contained 15 pus cells per high power field (uncentrifuged), and innumerable colonies of colon bacilli in 0.5 c.c. A pyelogram showed some dilatation of the entire left ureter and questionable dilatation of the right. Treatment was begun, using ammonium chloride and methenamine, but this caused diarrhœa and was discontinued. She was then given a ketogenic diet of carbohydrate, 12 grm.; protein, 15 grm.; and fat, 78 grm., for two weeks. After eight days the urine became sterile. Four days after normal diet was resumed the urine was still sterile. Four months after discharge from the hospital the urine culture was again negative. (See Table I.)

CASE 5

J.M., a girl of two years, was admitted to hospital in November, 1932, because of intermittent fever, abdominal pain and irritability of three weeks' duration. On examination, she was very pale and appeared acutely ill. The tonsils were moderately enlarged, with no cervical gland enlargement. The white blood cells were 30,600. A catheterized specimen of urine contained 50 to 70 pus cells per high power field and innumerable colonies of colon bacilli in 0.5 c.c. Blood culture was negative, as were the Mantoux' test and the blood Wassermann. A roentgenogram after injection of uroselectan indicated some enlargement of the left kidney, ureter, and pelvis. Cystoscopic examination and pyelogram showed the left ureter to be dilated and tortuous in its entire extent, but both renal pelves were normal. Treatment with urotropin and ammonium chloride was instituted, but in spite of large amounts of both with satisfactory pH of the urine the infection did not clear up. Ketogenic diet was then given for four weeks. This consisted of 10 grm. carbohydrate; 12 grm. of protein; and from 70 to 83 grm. of fat. At the end of this period the urine pH was 5.0 and there was no growth on culture. After normal diet for ten days colon bacilli again appeared in the urine. For another period of six weeks ketogenic diet was repeated. After five weeks of diet a urine culture showed only eight colonies of *B. coli* per half c.c. urine. The child then developed mumps, and normal diet was resumed. During the next month, urine cultures showed only occasional colonies of staphylococci, but no colon bacilli. Finally on discharge from the hospital the urine was sterile, and remained so for three weeks after discharge. (See Table II.)

TABLE I

TREATMENT—PATIENT NO. 4

Date	*Diet, medication, etc.*	*Culture*	*Urine pH*	*Urine Diacetic acid*	*Pus*
30/6/33		++++ *B. coli*		0	clumps
	Ammonium chloride and methenamine caused diarrhœa				
31/7/33		++++ *B. coli*		0	clumps
7/8/33	Ketogenic diet begun				
13/8/33	C–12 grm.; P–15 grm.;		5.6	+	
18/8/33	F–78 grm.	No growth	6.4	+	
20/8/33	Diet stopped		5.3	+	1 cell
25/8/33		No growth		0	0
12/1/34		No growth		0	

++++ = Innumerable colonies in 0.5 c.c. urine.

This patient is of particular interest as she had a readily demonstrable dilatation of the left ureter, probably congenital. Such patients tend to have recurring infections which may become very persistent. It is true that her first attack of pyelitis cleared up under treatment at home, but the duration of the attack was approximately three months. On the other hand, after a week of ketogenic diet the urine became sterile and remained so.

DISCUSSION

It has been shown by Fuller[5] and by Helmholz and Osterberg[6] that beta-oxybutyric acid is probably the bacteriostatic agent in ketone urine and that it acts only at a low pH. Fuller has shown that synthetically prepared, optically inactive B-oxybutyric acid has the same bacteriostatic activity as the 1-B-oxybutyric acid found in the urine. Helmholz and Osterberg have found that at a concentration of beta-oxybutyric acid of 0.78 per cent and a pH of 5.2 there was definite bactericidal power, but if the pH was 5.7 to 6.0 there was no bactericidal effect. In-

creasing the amount of beta-oxybutyric acid did not change the effect unless the urine pH were reduced to 5.5 or below. These authors state that a pH of 5.4 or less and a concentration of beta-oxybutyric acid of 0.5 per cent or more are both necessary to inhibit the growth of organisms. They have also developed a technique to determine rapidly the beta-oxybutyric acid concentration, using the sodium nitroprusside reaction for acetone and diacetic acid in the urine.[6]

TABLE II

TREATMENT—PATIENT NO. 5

Date	*Diet, medication, etc.*	*Culture*	*Urine pH*	*Urine Diacetic acid*	*Pus 1–4*
17/11/32		++++ *B. coli*			4
25/11/32		++++ *B. coli*			2
16/12/32	Urine from right ureter	Negative			
	" " left ureter	++ *B. coli*			
2/1/33	Ketogenic diet begun C–10, P–12, F–70–80				
5/1/33		++++ *B. coli*		+	
22/1/33		++++ *B. coli*	6.0	+	occas.
27/1/33		No growth	5.0	+	
28/1/33	Ketogenic diet stopped	" "	5.0	+	
7/2/33		++++ *B. coli*		0	
15/2/33	Ketogenic diet begun C–8, P–12, F–80				
23/2/33		++++ *B. coli*		+	
8/3/33		No growth		+	0
16/3/33		++++ *B. coli*		+	
21/3/33		8 cols. *B. coli*		+	
28/3/33	Mumps; stopped diet			+	
8/4/33		+ Staph.			
11/4/33		No *B. coli*			
1/5/33		+ Staph.			
3/5/33		No growth			
11/5/33		" "			
1/6/33		" "			

++++ = Innumerable colonies in 0.5 c.c. urine.
+ = Occasional colonies only.

SUMMARY

Four cases of persistent urinary tract infection are reported, with the results of treatment by means of large amounts of methenamine and ammonium chloride, and by means of ketogenic diet. The explanation for the action of the ketosis is outlined.

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ANÆMIA FROM LICE.—A. Finkel has followed the blood changes in laboratory attendants to whose arms daily applications of pediculi vestimentorum were made: culture of the vermin was required for preparation of antityphus vaccine. Small, repeated, daily blood losses of 5 to 10 grams led to increase both of red blood cells and of hæmoglobin percentage. With larger blood losses of 10 to 25 grams daily a secondary anæmia, with erythrocytes descending to 3,000,000 and a colour index of approximately unity, occurred in a few months. It is inferred that inhabitants of vermin-infested houses may as a direct consequence suffer from chronic anæmia. —Abs. in *Brit. M. J.*

A STUDY OF THE TWENTY-FOUR HOUR BLOOD SUGAR CURVE IN DIABETIC PATIENTS

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OUR interest in this subject was stimulated by the difficulty encountered in adjusting the insulin dosage in a youthful diabetic. This patient, a boy of 12 years of age, who had suffered from diabetes since the age of 2½ years, was repeatedly admitted to the hospital suffering either from diabetic acidosis or insulin shock. The patient's parents were intelligent and well versed in diabetic management, but in spite of their best efforts the above mentioned phenomena would appear from time to time.

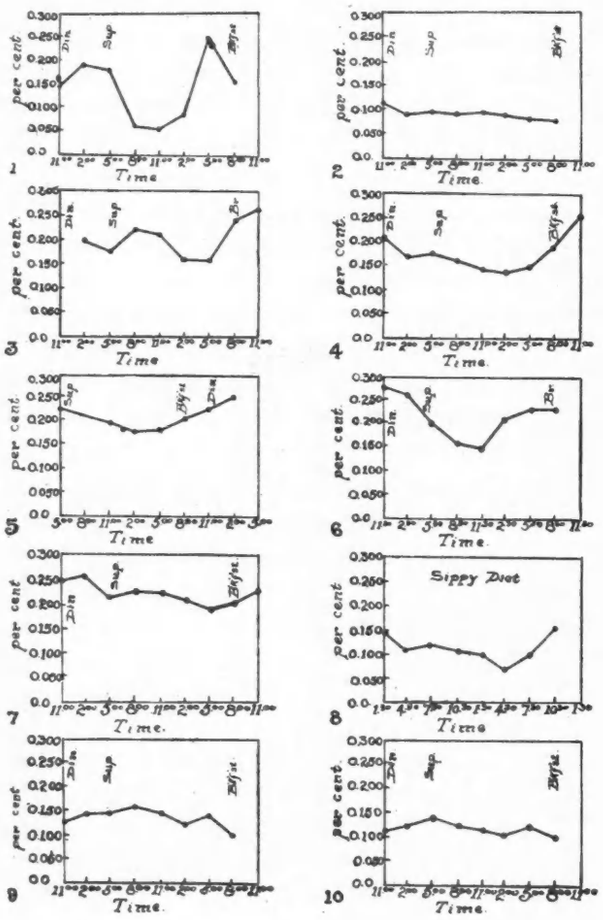
The patient for several months had been on a 1500 calorie diet, apportioned approximately as follows: carbohydrate 105, protein 60, fat 85. His meals were served at regular intervals, and he had been receiving 42 units of insulin daily, divided into 15 units half an hour before his morning meal, 15 units half an hour before the noon meal, and 12 units half an hour before the evening meal. On December 22, 1933, the patient had been feeling poorly all day, and urinalyses carried out at home showed heavy sugar in each specimen. His mother, on the basis of these findings, felt justified in administering an extra 5 units of insulin before the evening meal. The patient did not eat his usual full meal, and shortly after this he lapsed into a rather profound state of insulin shock. He was seen by one of us and ordered to the hospital, where he regained consciousness shortly after the administration of intravenous glucose. As this was only one of numerous similar episodes it was decided to carry out further studies, in order to gain a better understanding of these reactions.

Möllerström[1] has shown that there is a rhythmic cycle in the metabolic processes of the human individual, especially in regard to the carbohydrate metabolism. He showed that this was more marked in the diabetic, and had an important bearing in the timing of insulin administration. According to him, at certain hours of the day post-alimentary hyperglycæmia is milder and less prolonged. This varies in different individuals and from day to day in the same individual. Previously, Forsgren[2] had shown by histo-chemical methods that the carbohydrate metabolism of the body undergoes a cyclic change. He showed that the glycogen content of the liver is at its lowest in the daytime and highest at night. He felt that these changes were independent of nutritional conditions. Agren, Wilander and Jorpes[3] also found a rhythmic change in the glycogen content to take place in the liver, and to a lesser extent in the muscles. Higgins, Berkson and Flock,[4] on the other hand, believed that the changes observed were largely dependent on physiological factors associated with feeding. They felt that the variations hitherto described were directly dependent on the time the ingestion of food took place. In other words, the cyclic changes may be varied at will by changing the feeding time.

With these thoughts in mind, we decided that it might be of value to watch the blood sugar curve in our patient over a period of 24 hours. Accordingly blood was taken at 3-hour intervals for 24 hours. During this time insulin was only administered once, at 4.30 p.m., and the patient was given his usual 1500 calorie diet, each meal of which had a glucose value of 50 g. The blood glucose determinations were carried out as described by the Schaffer-Hartman method.

When these results were plotted in a graphic manner the curve in Chart 1 was obtained. The findings showed us the reasons for some of the phenomena we had been at a loss to understand. For the first six hours the results corresponded with what would be expected, in that there was slight post-alimentary hyperglycæmia which gradually subsided. At this point, due to a misunderstanding, 15 units of insulin were administered. As is quite apparent, there was a marked fall in the blood sugar level which continued on down and reached its lowest point about 11 p.m. To our surprise, from this time on there was a marked increase, reaching a peak

of 0.237 per cent at 5 a.m. This increase took place in spite of the fact that no nourishment was taken after 5 p.m. the preceding evening. That this was apparently not an unusual condition was indicated by the fact that the parents found the patient in a comatose state on several occasions late at night, and that it was almost impossible to obtain a morning specimen of urine which was sugar-free. It was also recalled that all of the patient's episodes of insulin shock had occurred in the late evening. It occurred to us that it might be possible to control his glycosuria better by giving the morning insulin at 4.30 a.m. before his blood sugar had reached its peak. When this was done it was found that his morning specimen was sugar-free and coincident with this the patient himself felt better.



This study led us to carry out similar curves on other diabetic patients. We established a definite procedure in this regard. All patients were placed on a standard 50 g. glucose meal; no insulin was administered, and blood specimens were taken at 3-hour intervals for a 24-hour period. The meals were given at 8 a.m., 12 noon and 5 p.m. No other nourishment was permitted. The exercise factor was eliminated by keeping the patient in bed during the test, and if possible for twenty-four hours previously to this. As a control a 24-hour blood sugar curve was done on a 35 year old woman who was being treated for a pelvic infection, but who was otherwise normal. This curve is depicted in Chart 2 and shows very little variation in the blood sugar level at any time of the day.

In this series various grades of diabetes were encountered, and various types of curves were found. They all had one thing in common, namely, that the blood sugar decreased in the late evening and early morning to reach the lowest level for the 24 hours, after which it began to increase, this rise occurring some time (in some cases several hours) before the morning meal. The practical application of this knowledge is shown by the following cases.

CASE 1

J. A. McC., male, aged 28, who had been under treatment for diabetes one year, had been unable to control the glycosuria, which was frequently associated with ketonuria, although he was taking relatively large doses of insulin. In spite of the glycosuria, he often had symptoms of mild insulin shock before the noon meal. He had been accustomed to having his breakfast at 8.00 a.m. and took his insulin at 7.45 a.m. He was becoming incapacitated for his work as an executive of a wholesale firm because of the acidosis and hypoglycæmia.

The 24-hour curve shown in Chart 3 offered a plausible explanation. It was apparent that a very definite rise in the blood sugar level took place between 5.00 and 8.00 a.m. By administering his morning insulin at 6.30 a.m. his glycosuria was readily controlled; he had no disagreeable symptoms either before or after the meal, although his breakfast was taken at the usual time and a smaller dose of insulin was required. After a week of this management the patient showed marked improvement and has continued to do so.

CASE 2

Mrs. C., aged 48 years, who had been under treatment with insulin for three months elsewhere, was brought into the hospital in insulin shock the later afternoon of February, 1934, and made a prompt recovery after administration of intravenous glucose. She had been taking 64 units of insulin daily. The 24-hour blood sugar curve was made the following day, beginning at 11.00 a.m. and is shown in Chart 4. This study indicated a marked elevation of the blood sugar level, beginning at 2 a.m. and showed a greater increase after 5 a.m. Her glycosuria was readily controlled by the administration of 35 units of insulin daily, the initial dose being given at 6.30 a.m. In order to prove to ourselves that it was the timing and not the dose of insulin that controlled the glycosuria, the morning dose was given at 6.30 a.m. and 7.45 a.m. on alternate mornings, and on each morning that the insulin was given late, sugar reappeared in the urine. The patient has continued on this routine, and has, according to last reports, been doing well.

CASE 3

Mr. J. M., 76 years of age, with a diabetic history of 7 to 8 years, was admitted to the hospital on January 30, 1934, for his annual period of observation. The 24-hour blood sugar curve is shown in Chart 5. This showed the same definite elevation of the blood sugar level in the early morning hours. A nice response to the early morning administration of insulin was obtained.

CASE 4

Mrs. H., 72 years of age, was admitted to the hospital, January 25, 1934, with incipient diabetic and arteriosclerotic gangrene involving the left foot. The only treatment she had received had been chiropractic and osteopathic treatment for one year previously, for claudication pain in the affected foot. No pulsation was obtained in either the posterior tibial or dorsalis pedis arteries in this extremity. In spite of adequate control of her underlying diabetic condition extensive gangrene developed and a high amputation was carried out successfully.

Chart 6 depicts the nature of the blood sugar curve for 24 hours in this patient. This again shows a marked decrease of blood sugar in the late evening with a decided rise in the early morning.

CASE 5

Mrs. T., 27 years of age, a private patient of one of us, had been under our observation since the onset of symptoms of diabetes some nine months before. She often complained of waking in the early morning with attacks of trembling and a feeling of faintness. This was more likely to happen if she increased her evening insulin, as she sometimes did after dietary indiscretions. She consented to entering the hospital on February 8, 1934, for a 24-hour blood sugar study and Chart 7 indicates the findings. This curve shows the same general tendencies noted in the above curves but not to the same extent. It is possible that another study might have shown a greater variation which would have explained the, presumably, hypoglycæmic attacks.

Charts 8, 9, and 10 are curves plotted from the results of studies carried out on three mild diabetics. Mr. H., whose blood sugar curve is shown in Chart 8, was on a Sippy diet due to a coincident gastric ulcer and was having no glycosuria. It is apparent that the variations, though not marked, showed the same tendencies. These patients were easily controlled by dietary means.

DISCUSSION

We realize that this series of cases is far too small to justify any sweeping conclusions, but on the other hand it includes every degree of diabetes and is representative of practically every age group.

We feel that work reported here confirms to a large extent that carried out by Möllerström and others. Its importance lies in the fact that it points to a better understanding of the treatment of certain cases of diabetes.

This study seems to emphasize the necessity of revising our present idea that a post-alimentary hyperglycæmia is always present and it offers a reasonable explanation for the usual increased morning glycosuria. It also suggests a reason for care in the administration of evening insulin.

CONCLUSION

A more rational treatment of diabetes mellitus is made possible in some cases by determining over a twenty-four hour period the blood sugar level with a view to giving insulin before the peaks are reached and thus more readily controlling the condition.

We wish to acknowledge our gratitude to the interne staff of the Royal Alexandra Hospital for their ready cooperation which made this study possible.

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ACNEFORM ERUPTIONS OF FACE: ETIOLOGICAL IMPORTANCE OF SPECIFIC FOODS.—Cleveland White observed a series of 32 cases in which there was a recurrent papular and papulopustular eruption of the body involving the usual areas in which acne vulgaris is ordinarily found. Some patients also had deep scars in these areas. These acneform eruptions have been found in these instances to be due to a specific food or foods. This type of eruption varies from the ordinary acne in that there are no comedones and no seborrhœa of the face or scalp, and in that it had not responded to the usual acne therapy. The roentgen therapy may have caused these ordinary acne manifestations to disappear and the etiology of the residual eruption which persisted was determined to be either a single or a multiple food sensitization. Treatment of these cases consists in the elimination of the causative foods when possible. Forbidding all animal and vegetable proteins for two weeks is beneficial only in cases of food idiosyncrasy of short duration. Desensitization by increasing gradually the amount of allergen, by either the oral or the intracutaneous route is another method of treatment. Oral administration with small doses of the offending food has been quite helpful in certain cases. In patients who are not sensitive to certain fish livers or corn oil, viosterol can be used to raise the patient's threshold at times to certain foods. Yeast has been used by practically all; in several, it caused new lesions. The use of viosterol in acne was recently brought forward by Doktorsky and Platt. The use of vitamin D as viosterol and ultraviolet irradiation has prevented new lesions, which had occurred from previously taken smaller amounts of allergic foods in several patients.—*J. Am. M. Ass.*, 1934, **103**.

EARLY DIAGNOSIS IN RECTAL CANCER AND PROGNOSIS ON THE BASIS OF DUKES' CLASSIFICATION*

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CANCER of the rectum in its early stages, at such time when radical surgery could offer a happy outlook, unfortunately presents itself as a lesion with few or no signs and symptoms. Definite signs and distressing rectal symptoms are evidence of malignancy too far advanced to hope for cure by any method of treatment. It may be said, almost dogmatically, that cancer of the rectum gives rise to definite signs and troublesome symptoms only when the growth has reached the stage of inoperability, or, at the very most, a speculative probability of cure by operation. The only exception to this statement will be the malignant lesions of the anus or anal canal, in which pain of a severe character is an early symptom. Such a lesion (squamous-cell carcinoma of the anus) is obvious on inspection and is therefore never overlooked.

The rectum being an excretory reservoir, subject to overloading and neglect from time to time, quite naturally will not direct serious attention to any slight abnormality of function. Most people, from time to time, may experience periods of constipation or slight rectal discomfort, proof of which may be found on the shelves of most household bathrooms. The early symptoms of rectal cancer may be no different from ordinary constipation, and will respond quite well to the usual laxatives, which however must be persevered with.

The lesion always begins above the pectinate line (except in squamous-cell carcinoma of the anus), in the mucosa, and soon extends to the submucosa of the rectal wall. The rectum and recto-sigmoid are quite insensitive to pain stimuli, as can be seen by the painless removal, without anæsthesia, of adenomata or papillomata by diathermy. Pain will be present only when the growth in its later stages has extended through the rectal wall into the extra-rectal tissues, involving the prostate, urethra or sacrum, or has involved the anal canal by direct downward extension. Pain is also present late in the course of the disease, where the growth fills the pelvis and presses on pelvic and sacral nerves.

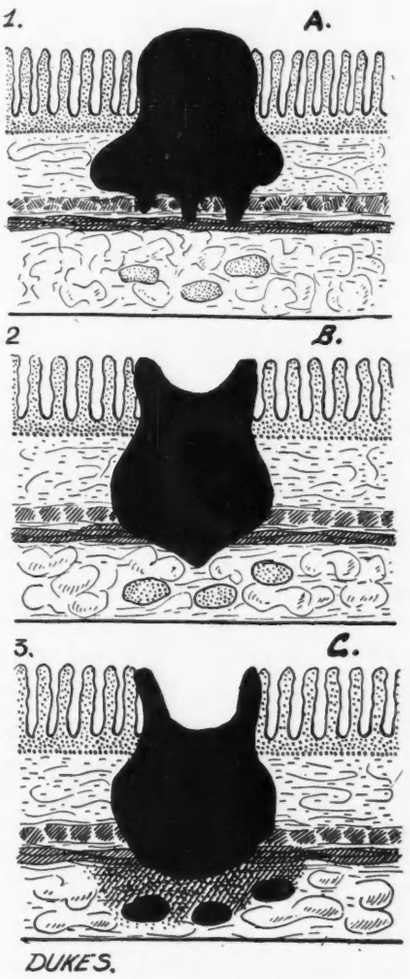
Cuthbert Dukes[1] in 1932 made his splendid contribution upon the histological evolution of rectal cancer, which has done a great deal to help us to understand the early symptomatology and prognosis in rectal malignancy, and clearly demonstrates why pain and other troublesome symptoms (seen in well established rectal cancer), are not found in the early stages of the lesion. From his studies it can be seen that the evolution of rectal cancer is such that signs and symptoms of a troublesome nature are, because of the histological picture and mode of spread of the lesion, characteristic of the disease only in its later stages. In collaboration with Mr. W. B. Gabriel,[2] surgeon to St. Mark's Hospital for Rectal Cancer, Dukes has shown that the histological study of the lesion removed at operation, on the basis of the degree of direct spread, will provide one with an accurate prognostic index. The groupings are known as A, B and C, and will be discussed presently. The accuracy of this histological grouping has been confirmed subsequently at St. Mark's Hospital in several hundred operative cases.

THE DUKES' CLASSIFICATION OF RECTAL CANCER

This classification is based upon the histological study of the organ removed at operation and, unlike the Broders'[3] classification, was not promulgated as a pre-operative method of grading malignancy. However, the object of this study is to show that even pre-operatively, by careful proctoscopic examination and digital palpation, one can nearly always arrive at a fairly accurate tentative appraisal of the state of the lesion. This will be dealt with subsequent-

* Prepared during tenure of assistantship, 1933.

ly. Broders attempts by his method to determine prognosis on the basis of the degree of cell differentiation, as determined by a "punch" biopsy. Such an evaluation, whilst useful, is unfortunately not accurate. In an A case of the Dukes' classification the lesion may contain relatively immature cells and yet offer a splendid prognosis, and, conversely, a C case by the Dukes' classification may contain cells which are quite differentiated and yet offer a hopeless prognosis.



THE HISTOLOGICAL EVOLUTION OF RECTAL CANCER. (Dukes' classification).

1. A Group—in which the growth is limited to the wall of the rectum, without extra-rectal spread or metastases to regional lymph nodes.
2. B Group—in which the growth has spread to extra-rectal tissues, but without invasion of regional lymph nodes.
3. C Group—shows the late stage in the evolution of the lesion. Deep ulceration is present. There is extensive extra-rectal spread with involvement of regional nodes.

The principle of the Dukes' method is the classification of rectal cancer (after the rectum has been excised and examined) into three categories according to the extent of spread by direct continuity. A cases are those in which the carcinoma is limited to the wall of the rectum, there being no extension into the extra-rectal tissues and no metastases to regional lymph nodes. B cases are those in which the carcinoma has spread by direct continuity to the extra-rectal tissues but has not yet invaded the regional lymph nodes. C cases are those in which, after extra-rectal spread, metastases are present in the regional lymph nodes.

The earliest appearance of rectal cancer is that of a growth projecting into the lumen of the bowel. As invasion occurs into submucosa and muscularis, a cutting-off of the blood supply to the bowel wall and lesion occurs, and the lesion changes from a projectile protruding tumour mass to a flat and, still later, to an ulcerating one. The amount of central ulceration depends therefore upon interception of the blood supply as the result of the direct spread of the malignant process through the bowel wall. In the later stages of the disease (C cases) one can observe a deeply ulcerated lesion, due to extensive interception of the blood supply. The Dukes' classification of rectal cancer is based upon this conception and recognizes three stages in the evolution of the malignant process.

In A cases, the growth is limited to the wall of the rectum and is superficial in nature; and although the process may extend down into the muscularis this is not marked nor advanced enough to interfere with the blood supply to the lesion. The growth is intramural and protrudes into the lumen of the bowel; it is projectile in nature, firm to the touch, and without any central sloughing. In B cases extension through the rectal wall into the extra-rectal tissues has occurred. There is early incomplete interception of the blood supply to the lesion. The growth is no longer the protruding type of lesion, but at its centre has become flattened. There may be early central ulceration. There is no glandular involvement at this stage. In C cases, the lesion is advanced. Extension has now occurred to the extra-rectal tissues and there is regional lymphatic involvement. There has been massive interception of the blood supply to the rectal wall and its lesion, and one observes a deeply punched-out ulcerative growth, with a hard, raised, everted periphery. Such a lesion may be large, or, on the other hand, quite small in area.

Confusion exists concerning rectal cancer. One reads of the high percentage of five year (and over) cures in early rectal malignancy; and, on the other hand, certain well informed general surgeons regard cancer of the rectum as a lesion with a very grave prognosis. The latter position is true only as long as routine rectal examinations and proctoscopic investigation are neglected in cases with vague symptoms. Such vague symptoms may be the need for laxatives in the individual with a heretofore regular bowel habit, dyspepsia, belching and unexplainable fatigue, dull backache, frequency of urination (referred), the sudden onset of troublesome "piles", and a dissatisfied feeling after bowel movement. The patient's general condition at this stage is good and there are no definite rectal signs and symptoms. Later, when bleeding, loss of weight, anæmia and obstruction supervene, (text-book signs and symptoms for rectal cancer) the old attitude that rectal cancer is hopeless and metastasizes early is a correct one. Such early metastases as have hitherto been described are actually the late metastases of C cases, for rectal cancer metastasizes late in the course of the disease, and for a long time remains a local intramural lesion. The heretofore described metastases to the liver, the paracolic, lumbar, aortic, and iliac glands in so-called early cases, must be regarded in the light of Dukes' work as the later glandular metastases of C cases. After the spread to the peri-rectal fat, the investing sheath of the rectum keeps the lesion restricted for a long time. The retro-rectal glands are nearly always first involved, and only quite late in the course of the disease will one observe such distant metastases. Gordon-Watson and Dukes[4] have shown, quite conclusively, that retro-rectal and distant metastases are not found until the lesion has spread by direct continuity through the rectal wall into the extra-rectal tissues. Cases in which lymphatic metastases have been found at an earlier stage are recorded by Miles, but must be extremely rare. Rankin[5] states: "Fortunately in all carcinomas of the rectum, metastasis is a slow process, and lymphatic involvement does not occur early." However, one *may* observe distant metastases in certain rare cases, without retro-rectal glandular involvement, only in C cases where the growth has already broken through the investing rectal sheath. The metastatic cells have thus travelled through the retro-rectal glands, and, without settling there, have been deposited in more distant foci of drainage.

Mode of Pathological Study

The tumour-bearing segment of the gut received from the operating room is opened up with a large pair of scissors, cutting along the wall opposite the growth. The intestinal contents are washed away with a stream of formalin, the specimen pinned out immediately on a large flat piece of cork, and immersed in a jar of 10 per cent formalin. After two days a series of thin slices is cut through the tumour from within outwards. The cancerous tissue is seen to have a firm yellowish-white appearance with a well defined boundary. A thin block of tissue, half to one inch square, is removed from the region of deepest penetration, consisting of approximately equal parts of tumour and apparently normal tissue beyond. The margin of the tumour on direct naked eye observation is so distinct, and the colour contrast so sharp, that without microscopic examination one can accurately determine the extent of the cancerous invasion. However, one proceeds now to embed and section the block, and the exact extent of the growth by direct continuity is decided by microscopic examination. The degree of extra-rectal spread and lymph-node involvement is determined as follows. The specimen is turned over and a series of thin sections cut through the extra-rectal tissues from without inwards. In such thin slices the lymph nodes can be seen and felt, and all are removed for microscopic examination as discovered. The extent of infiltration by direct continuity can usually be determined by inspection, but the size and feel of the lymph nodes does not give any indication as to whether or not they contain metastases. The regional lymph nodes are often palpably enlarged from infection; on the other hand, they may not be conspicuously increased in size when containing metastases.

Pre-operative Clinical Appraisal of the Prognosis on the Basis of Dukes' Studies

In the light of Dukes' studies upon the natural evolution of rectal cancer, and after a careful history and examination, one should be able to arrive at a reasonable decision concerning the stage of the disease, *i.e.*, whether the

case is A, B, or C. From Dukes' observations it can be seen that an early rectal cancer, *i.e.*, an A case, takes the form of an epithelial proliferation rising from the surface and protruding into the bowel lumen, the appearance suggesting a large adenoma which has undergone malignant changes. Upon proctoscopic examination the lesion is observed as a cherry-red protrudent, nodular, or paler papilliferous growth, with integrity of surface. The apex of the lesion presents as firm a consistency as is present at the periphery. This can be demonstrated by abutting or striking the lesion with the end of the proctoscope. Although bleeding may be induced by this manœuvre (as also in the case of a benign adenoma or papilloma) none of the tumour will be chipped off, *i.e.*, fragmentation does not occur. On touching the growth with the end of the instrument, the sensation imparted is that of firmness but not deep fixation, *i.e.*, the lesion presents at this stage a degree of mobility. On inspection, the growth is quite vascular, and the centre of the lesion is protuberant and not flattened or ulcerated. Although bleeding may be easily induced, yet there is no bloody-mucoid discharge constantly obstructing one's view, as seen in later cases, and after swabbing out the rectum of any free blood induced by digital palpation or the passage of the proctoscope one will not thus be further troubled, and the field remains quite clear. The size of the lesion is of no importance, since a large mass may prove to be an early A case, whereas a small punched-out lesion may prove to be a late C case. In these early cases, upon proctoscopic examination, one finds the mucous membrane surrounding the lesion pink and healthy in appearance. (Benign adenomata may be found either above or below the growth or a double malignant lesion may be present). There is no congestion from constant discharge and mixed infection. The peri-anal skin is healthy and peri-anal pruritus is generally absent. Upon digital palpation, if the lesion can be reached, one confirms the proctoscopic findings. The growth possesses integrity of contour, it is mobile, and there is no central ulceration. High rectal lesions cannot be thus digitally examined, since often one can just reach the bottom of the growth. However, by properly invaginating one's index finger at its metacarpophalangeal joint into the region between the tuberosities of the ischia, *i.e.*, carrying the external sphincter forward on one's knuckle, so to speak, one can gain distance and often reach above the lesion. In A cases symptoms and signs are few and are usually of the vague character already described. The lesion may be stumbled upon accidentally during examination, or, because of increasing constipation, the physician's attention may have been directed to the terminal bowel. The striking thing about an A case will be the patient's good colour and robust appearance.

In B cases there is usually a history of persistent unexplainable constipation, perhaps alternating with periods of "looseness". In some cases there has been noticeable bloody streaking, with either constipated or loose stools; on the other hand, in others, there is no history of blood with stools. The patient's general condition is fair, although there may be unexplainable fatigue, low backache of a dull nagging character, hypogastric discomfort, and perhaps attacks of vesical irritability. Large hæmorrhoids may make their spontaneous appearance. At this critical period the patient may enjoy many months of comparative comfort and freedom from symptoms by the persistent use of salines or liquid paraffin. Since these bring relief, the patient is content and carries on until such time as troublesome signs and symptoms make their appearance (C case). Upon digital palpation, if the growth can be reached, some fixation is apparent, and one is not impressed by any free degree of mobility of the mass. On sweeping the finger over the surface of the growth. protuberance of the apex is absent and there is definite flattening. The periphery of the growth is harder than the central part, and bleeding is more freely induced. Rougher handling will free shreds of the growth. Upon proctoscopic examination much free bleeding is induced, and it is difficult to keep the field clean. The growth upon palpation with the end of the instrument appears quite fixed. The lesion is highly vascular, but the central area is somewhat paler and presents some flattening. Bits of the growth may be chipped off from the centre by pressure from the proctoscope. There may be some central ulceration at this stage, with early eversion of the periphery of the lesion. The lesion no longer possesses integrity of contour, the field is constantly obscured by free bleeding which is bloody-mucoid in character, and the surround-

ing mucous membrane is injected and hyperæmic. Together with this there may be perianal pruritus and skin changes, the result of discharge of which the patient may be unaware.

The C case is characteristic. Rectal signs and symptoms may have been present for many months, or distressing rectal symptoms and signs may have just recently presented themselves, following upon a period of disturbed bowel action and failing health. The patient looks ill, there being an obvious anæmia. Unlike cancer of the cæcum or stomach, anæmia and general undermining of the patient's health are late in their onset. Rectal signs and symptoms are now definitely present and troublesome. Digital palpation reveals an ulcerative punched-out lesion with everted edges. If marked central ulceration is not present as yet, then one is surprised to be able to chip fair sized pieces off the growth on simple examination. The growth is markedly fixed and there may be extension to surrounding structures. Bleeding is freely induced, and there is now mixed infection due to ulceration of the lesion. There is a purulent bloody discharge, and some degree of peri-anal pruritus. Inguinal adenopathy is not present even in advanced C cases unless the growth has extended down and involved the anal circumference. Abdominal examination may show a distended sigmoid and descending colon if obstruction of some degree is present. This is the result of mixed infection plus œdema. Proctoscopic examination reveals a punched-out ulcerative lesion with eversion of the periphery. The field is constantly obscured by bloody pus, fragments of growth, and débris. Marked fixation is demonstrated with the end of the instrument, and one may be fortunate enough to find the opening of a recto-vesical or recto-vaginal fistula. There is some degree of proctitis, because of the superimposed infection upon the neoplasm.

Clinical Application of the Dukes' Classification in Estimating Prognosis

In 215 cases of cancer of the rectum removed by surgical excision, as quoted by Dukes,[1] 38 (18 per cent) were A cases; 76 (35 per cent) were B cases; and 101 (47 per cent) were C cases. Mr. W. B. Gabriel,[2] surgeon to St. Mark's Hospital for Rectal Cancer, in his book reports upon the results of 60 cases of rectal cancer that were followed after operation by perineal excision from 1927 to 1929. Of the total, 15 were A cases; 24 were B cases; and 21 were C cases. One B case and four C cases died after operation. All of the A cases survived operation. At the end of three years, 12 of the A cases were alive and well (86 per cent); 16 of the B cases were alive and well (73 per cent); and 3 of the C cases were alive and well (19 per cent). These figures are striking, and show the splendid prospect for cure in the A cases, somewhat worse for the B cases, and quite discouraging in the C cases. There can be no doubt that at the end of five years the difference in prognosis between the A, B and C group will be even more marked. At the present time it is evident that the A group offers the best prospects in post-operative morbidity and ultimate survival. The B group presents a fair outlook, and the C group an almost hopeless one.

Summary and Conclusions

The possibility of grading rectal cancer pre-operatively, on the basis of Dukes' histological classification, is suggested by this study.

The contrasting clinical pictures in A, B and C cases are presented in the light of Dukes' histological studies. The remarkable and distinct clinical differences between A, B and C cases, all phases in the natural evolution of rectal cancer, are recognized.

Such a pre-operative grouping, although a great help in evaluating prognosis and in determining operability, moreover points the way to and insists upon early diagnosis in rectal cancer.

The study emphasizes the subtle insidiousness of rectal malignancy in the early stages of its evolution.

In this study the author has drawn upon the pathological studies of Dr. Cuthbert E. Dukes and upon the statistics of Mr. W. B. Gabriel, F.R.C.S. He gratefully acknowledges his indebtedness to Mr. W. B. Gabriel for many kindnesses shown during his period as his assistant. To Dr. Dukes and the staff of St. Mark's Hospital he also acknowledges his gratefulness for many favours and much help.

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CLINICAL OBSERVATIONS ON THE USE OF EVIPAN*

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THE newest and most spectacular drug at the command of the anæsthetist is known as "evipan". It is not, at present, available commercially, but has been distributed to interested hospitals by the manufacturers, under their experimental number "E 334-1". This paper deals with the use, in 30 cases, of this drug, in St. Michael's Hospital.†

Evipan is the latest of the seemingly endless series of barbituric acid derivatives, differing from many in that it is designed for intravenous use. Chemically, it is the sodium salt of N-methyl-cyclohexenyl-methyl-malonyl-urea, and is in the form of a white crystalline powder, quite readily soluble in cold water. It is put up in large ampoules, each containing 1 gram of the dry powder, which is to be dissolved in 10 c.c. of distilled water, making a 10 per cent solution of the strength of 100 mg. per c.c. The dosage is most conveniently expressed in cubic centimetres of this standard solution, but for purposes of accuracy would, possibly, be best referred to in milligrams of the actual drug.

Its field of usefulness is decidedly limited, but in that field evipan stands pre-eminent. Injected intravenously it produces in 60 to 70 seconds full surgical anæsthesia, with relaxation sufficient for practically any procedure which can be completed in from 5 to 20 minutes. That is the average time available for an actual operation, and varies with the dosage used, the personal reaction of the patient, and the degree of relaxation required. At the end of that time the patient regains consciousness with amazing rapidity, and in most cases, but by no means all, is entirely rational in about 25 to 30 minutes from the start of injection. It is, of course, this complete recovery in such a short period of time, following such full relaxation, which constitutes the great advantage of this agent in certain specific procedures which until now have been best carried out under gas.

Evipan must be looked upon, at present, largely as a substitute for nitrous oxide in minor surgery. To the qualified anæsthetist, working in hospitals fully equipped for gas anæsthesia, it may appear only a pharmacological curiosity. Undoubtedly, he can in the future, as in the past, carry on very well with nitrous oxide or ethylene. But for the surgeon who works without the assistance of a regular anæsthetist, and in the inadequately equipped hospital or isolated home, evipan may, quite possibly, prove to be more than a laboratory plaything. Not for one moment is it suggested that it can yet be placed in the hands of the general practitioner, but results, so far, justify more widespread use by trained workers. In this way, a safe technique may be found which will bring to the patient undergoing a short, minor operation in the home or small hospital, the comfort, safety and convenience now denied him. Even the busiest anæsthetist is at times called upon to work in a home or private hospital. How often is he forced to subject his patient to the detestable experience of an ether induction and subsequent post-operative vomiting, or fall back on ethyl chloride? We questioned all of our patients who had had previous inhalation anæsthetics as to comfort during induction and recovery; without exception they favoured evipan, even in preference to nitrous oxide. Many people have a positive horror of breathing in any gas or vapour, however innocuous; others absolutely refuse to permit any procedure under local or spinal anæsthesia; to them, a satisfactory intravenous drug would be a priceless boon. To the busy doctor who must wait at the bedside for his ether patient to regain consciousness evipan is a welcome time-saver. In the operating room, its use minimizes delay between cases, since the technique is much simpler than that of spinal or local anæsthesia, and relaxation can be obtained in a fraction of the time required with ether or even nitrous oxide. These are points which must be considered in evaluating the method, just as much as the more

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† Supplied by the Winthrop Chemical Company.

strictly scientific findings. It is much too soon to state that evipan is the ideal drug, but certainly it has much to recommend it. Among the more obvious disadvantages may be listed the mechanical difficulty attending intravenous injection in children, in nervous adults, and in obese patients with small veins. For them, as for the patient who dreads the needle more than the mask, evipan loses many of its advantages. Because it is not universally applicable, however, is no reason for failing to use it where really indicated.

The entire action is so startling that it must be seen to be appreciated. If injected at the rate of 1 c.c. in 10 seconds, it will be found that at 20 seconds the patient is talking normally; at 30 seconds he is confused or incoherent, but entirely calm and peaceful; at 40 seconds he goes to sleep in the middle of a word, often with a preliminary yawn; at 50 seconds respirations become gradually more superficial, with practically no change in colour, pulse, or blood pressure; at 60 seconds he is in full third-stage anæsthesia and the operation commences. That type of absolutely quiet induction can be largely duplicated with intravenous nembutal or sodium amytal, but the later course of anæsthesia differs radically. As regards duration, much of the apparent discrepancy in various reports may be accounted for by the type of operation attempted and the degree of relaxation demanded. Relaxation sufficient for the curettage of osteomyelitis of the tibia, for instance, may be wholly inadequate for tonsillectomy. That is just as true here as with nitrous oxide or ether, and must be considered in deciding if evipan is suitable for use in any particular case. As with an inhalation anæsthetic, there is a period of complete analgesia preceding and following the stage of full relaxation. During this time, if not disturbed, the patient lies as in normal sleep. If the operation starts too soon or is continued too long, there will be reflex movement following pain stimuli, but an entire absence of pain sensation. If this muscular resistance does not seriously impede the surgeon, the operation may be started before complete relaxation sets in and continued after it disappears. In such cases, there will be no recollection whatever of the procedure. Full relaxation (including that of the jaw muscles, with absence of cough and gag reflexes) has, in our experience varied from 2 to 10 minutes. However, the total time of unconsciousness, with a useful degree of relaxation, has been more uniform at around 10 to 20 minutes. Following the conclusion of the operation the patient lies quietly as in natural sleep, for possibly five minutes, and then rolls over, opens his eyes, and looks around. Frequently he speaks rationally at once. More often, he moves about, tries to sit up, and, for a moment or two, appears dazed—able to help himself on to the stretcher and answer direct questions, but not for another four or five minutes to be considered entirely rational. Occasionally, there may be hysterical crying, moaning or even shouting. This has been rare and only in highly nervous patients or in those who have received full doses, that is, relatively large doses considering physical contraindications, or doses exceeding those advised in the weight table—particularly if morphine has been previously given. None of these caused the slightest concern, but their behaviour detracted from the good record of the others. Except for this group, recovery was almost always complete in from 25 to 30 minutes from the start of the injection, at which time the patient could sit up without headache or dizziness, drink water without nausea, and discuss fully his sensations before and after his sleep. In one case only was this full recovery delayed longer than one hour from the start, and even then it was remarkable to see the rapidity with which recovery was completed, once the stage of opening the eyes was reached. This time of semi-consciousness was much shorter than after ether, and the cough reflex and movement of the tongue returned so early that there was relatively little danger of obstruction of the airway. It was, essentially, a very deep, normal sleep, in which the patient moved around and seemed to find the most comfortable position in bed. The nursing care presented little difficulty in bed patients, since less supervision was needed than in ether cases. For office or out-patient use, however, some provision must be made for a recovery room. The majority of ambulatory patients will be able to walk home in 40 to 50 minutes from the start of injection, but others will, undoubtedly, require watching for an hour or longer. Experience in dosage and avoidance of sedatives will reduce these slow recoveries to a minimum,

but they will be encountered occasionally, just as they will in similar operations with nitrous oxide, where the "whiff of gas" that the surgeon asks for proves insufficient, and a little ether must be added. The entire absence of nausea (except in mouth work, where blood had been swallowed) is noteworthy. On the whole, it may be said that in our best cases recovery was as good, or better, than that from uncomplicated nitrous oxide anæsthesia of about 20 minutes' duration, and in our poorest cases recovery was considerably more satisfactory than would have been expected with ether, in the same patient and the same operation.

The reader's immediate reaction is one of doubt. How unfounded is this scepticism is shown by the fact that in our series of 30 cases, the following operations were satisfactorily carried out, with no preliminary sedative and no supplementary anæsthetic, either local or general—incision of abscesses, dilatation and curettage, insertion of radium in the cervix, hæmorrhoidectomy, extraction of teeth, tonsillectomy, exploration of infected abdominal wound, and the control of convulsions in tetanus.

The technique of administration is as simple as that of novarsan in syphilis. The powder is sufficiently soluble to allow preparation of the solution directly in the ampoule and 10 c.c. syringe. Because of the very short period of anæsthesia it is important that all preparation of the patient be complete before injection is made. He is placed in proper position on the table and full sterilization of the field and draping with sterile sheets, etc., is carried out. That this can be done with practically no danger of later contamination is the best comment on the smoothness and comfort of induction. Then, with the surgeon standing ready to make his incision, injection commences. If possible, this should be made by an assistant, leaving the anæsthetist free to watch the patient and direct the speed and volume used. So rapidly does the condition of the patient change that it is rather difficult to give a smooth injection while watching for signs of overdosage. The best results will be obtained where both the surgeon and anæsthetist are familiar with the period of induction. In an emergency, the surgeon himself could make the injection, and then proceed to operate, leaving a nurse or relative to hold the jaw, just as some surgeons now conduct their own spinal anæsthetics or the dentist administers gas by himself. This is not a procedure to be recommended however, nor is it likely to be adopted, except by the more venturesome.

The rate of injection seems to be highly important. The literature warns against too rapid injection, which is followed by tremor or convulsions. We have been able to avoid such reactions by holding the rate as closely as possible to 1 c.c. in 10 seconds. In one case (a twenty-year old man, of 125 lbs., in good health) this was exceeded. Sleep came on in 15 seconds, followed immediately by muscular twitching similar to jactitation; the pulse became rapid and somewhat weaker; the respirations became slower and more superficial, with slight cyanosis. This condition lasted for possibly 20 seconds, during which time injection was suspended. The respirations then picked up, the pulse returned to normal in rate and quality, the colour became exceptionally good, and the patient opened his eyes. The injection was resumed until the calculated dose was reached. Anæsthesia was no deeper than usual, but sufficient for the easy removal of the tonsils, although they were badly fibrosed from previous quinsy. Recovery was slower than usual, and for 20 minutes he was quite noisy. This was one of two patients who caused some annoyance to the nurses. He was perfectly rational, however, in 55 minutes from the start. This was the only case which could be classed as unsatisfactory, and at no time was the reaction alarming. It can only be explained by the too rapid injection, and we have accepted the warning and been guided by it. This case showed, in an exaggerated form, a respiratory cycle which we have noted, to a much lesser degree, in every patient. Immediately following unconsciousness, the respirations become gradually more and more superficial, but remain regular and of normal rhythm, until, after possibly ten breaths, the movement is scarcely perceptible. There may even be a pause equal to two or three breaths, and then the movements gradually deepen again until full volume is reached at the point corresponding with general relaxation. This has been constant in every administration and differs from anything seen in inhalation anæsthesia. The colour remains unusually good, even if the pause covers a period equal to several

respirations. The pause may be shortened by slight pressure on the chest or by moving the head or legs. The appearance of the patient throughout is so good that no alarm is felt. This has been commented on in the literature, all writers emphasizing that no ill-effects have been noted. It is less marked with very slow injection, but need cause no concern at the rate of 1 c.c. in 10 seconds. A slower rate is more difficult to maintain, but allows more accurate observation of the reactions. At present, the patient passes so quickly from stage to stage that it is extremely difficult to actually time the changes, but our results closely approximated the outline given above. It would seem logical to use the same total dosage in a weaker solution and so spread out the stages. This may prove to be the eventual procedure.

Intravenous medication is usually referred to as "uncontrollable", because the solution, once injected, cannot be recovered. Not so with evipan, for close observation of the stages through which the patient passes, while injection is still incomplete, allows the dosage to be matched to the individual. So rapid is its action that the administration may be continued or stopped at any time, depending on signs of the desired effect. It is one of the few drugs which we can actually watch at work, and this forms the basis of the most satisfactory method of determining dosage. The manufacturer provides a table of doses calculated on body weight—approximately 15 mg. per kilo or 7 mg. per pound. We look upon this weight dose as a maximum, to be exceeded only with considerable caution, rather than a definite standard to be used in each case. We prefer the method advocated by several writers, *viz.*, to judge the individual patient's reaction to the drug by his response to the injection of enough to induce unconsciousness, and to be guided in regard to the total amount by that early reaction. In general, the sleep-inducing dose may safely be considered as one-half of the full dose. Thus, the patient who goes to sleep rapidly on 3 c.c. will probably be relaxed on from 5 to 6 c.c. although the dose by weight may be considerably more. In such a patient, to continue to the full weight dose would almost inevitably lengthen the period of recovery, without necessarily giving a corresponding increase in the operating time. To exceed the weight dose would certainly cause some depression of respiration and blood pressure, and, while this might be in no sense alarming, it nevertheless would neutralize many of the advantages claimed for the drug. The outstanding characteristics of evipan (normal sleep, full relaxation without depression, and recovery in 25 to 30 minutes) will be found, as a rule, only in patients who can be controlled by a dose approximately equal to twice the sleep-inducing volume and not exceeding the amount calculated by weight. If more than twice the sleep dose is given, or if the weight dose is exceeded, it is quite probable that the results will not be in keeping with the more spectacular reports. The exception to this lies in the case in which the full dose is given slowly, as required. The operation starts at the usual time, but the needle is left in place. Then, if relaxation becomes insufficient after a few moments, a further 0.5 c.c. is given, and repeated at intervals throughout the operation. This is probably the ideal method, since it allows completion of the work should unexpected complications prolong it beyond the estimated time. All of our later cases have been handled by this fractional method, as the drug can thus be more accurately suited to the individual patient than by using an arbitrary dose based on body weight. We have, in this way, given as high as three times the sleep dose without undue depression, but, of course, recovery was delayed—2 hours from the start.

The literature contains several references to total doses of 20 c.c. followed by no ill effects. We have not exceeded 10 c.c., except in one case—a very well developed, muscular man of 185 lbs., who received 15 c.c. over a period of 18 minutes for hæmorrhoidectomy. Anæsthesia was excellent. He showed absolutely no untoward reaction and was fully rational in 40 minutes from the start of injection. He was given 9 mg. per pound as against a calculated weight dose, for patients in the normal weight range, of 7 mg. per pound. Had he been obese, rather than muscular, this dose probably would have caused considerable depression. The fatal dose, however, based on animal experiments, is said to be 45 to 50 mg. per pound. There is thus a very wide margin of safety, particularly as respiratory failure precedes stoppage of the heart. Artificial respiration has frequently been used to save the experimental animal after doses four to five times those required for

surgical anæsthesia. Fortunately, we have had no occasion to verify this in the human being.

In most cases of large dosage immediate recovery need not be expected, nor will it be seen if morphine or other sedative has been given. We have used morphine five times, but feel that it adds materially to post-operative depression without giving sufficient increase in the period of relaxation to justify its use. Many writers advocate morphine or pantopon beforehand, and these appear safe, but the patient certainly does not present the appearance of the normal sleep seen with evipan alone. Instead, he more nearly resembles the patient depressed by a full dose of avertin or nembutal, exhibiting lowered blood pressure, shallow respirations, and consequent cyanosis. This also may be expected where full doses are given to the obese, the old and debilitated, the dehydrated, or the toxic patient. The three patients who showed the slowest recoveries were, respectively, over-weight, under-weight and of low metabolic activity. In each of these, the operating time was not prolonged in proportion to the slow recovery. Such reaction was anticipated in each case, on the basis of experience with avertin, since the contra-indications seem very similar with both drugs. Pre-operative sedatives should, therefore, be used with considerable caution, and only after some experience with evipan by itself. Most of our patients received full doses of morphine or codeine within an hour after operation without trouble. It would seem most unwise to use luminal, nembutal, or other barbiturate, either before or after evipan.

Post-operative complications have been entirely absent. We have seen no evidence of systemic damage of any kind. In four cases there was no significant change in the blood sugar, urea nitrogen, or van den Bergh reaction. This was in keeping with the findings of several writers, who, after extensive observations, abandoned post-operative blood chemistry, as the results were consistently negative. There was no tissue damage at the site of injection, despite leakage of the solution in five cases.

In conclusion, the following salient features of this small series are presented, as justification for the opinions expressed. The age varied from 17 to 65 years. The weight varied from 95 to 225 lbs. The blood pressure varied from 100 to 240 (systolic) immediately before injection. Pre-existing disease complicated certain cases—diabetes, early bronchiectasis, hypertension, endocarditis, and advanced carcinoma. The type of operation influenced results as follows:

(A) Incision of abscesses: (2). Small doses gave excellent results.

(B) Vaginal and rectal operations: dilatation, curettage, and insertion of radium (3); Hæmorrhoidectomy (4). Full doses were required, but with the fractional method anæsthesia was satisfactory up to 20 minutes, actual operating time. One man, of the low metabolic, obese type, who reacted excellently on the table, was excited and noisy during recovery, and not fully rational until almost two hours from the start. He had received three times the sleep dose, a total of only 9 c.c., as against a weight dose estimated at 10 c.c.—a warning against the routine use of a dosage based on body weight alone. His reaction took the form of excitement rather than depression, and bothered no one but the nurses.

(C) Abdominal operations: (1). This was an exploration of a broken-down incision, in general peritonitis, in a very bad risk who had previously reacted poorly to spinal anæsthesia. Relaxation was excellent for ten minutes and the patient, a female, was fully rational thirty minutes from the start. The place of evipan in abdominal surgery, however, is debatable. In all cases we tried to roughly estimate abdominal relaxation by palpation. It seemed satisfactory for from 5 to 15 minutes, except in three muscular men.

(D) Mouth operations: extraction of teeth, (5); drainage of abscess in the floor of the mouth, (1); tonsillectomy, (13). For dental work evipan was much superior to nitrous oxide during actual extraction. Post-operative behaviour varied with the type of patient and the number of teeth involved. Two patients walked home in 45 and 60 minutes, respectively. One was a bed patient, and fully rational in 20 minutes. The remaining woman had two administrations, for 13 and 14 teeth, respectively. Each time, she slept quietly, with mild depression, for about an hour, and awakened fully rational, but too exhausted to walk out until three hours after the start. For office or out-patient practice this ever-present possibility of delayed recovery is objectionable. This patient was typical of a large percentage of those

requiring general anæsthesia — under-weight and in poor health, due to a large number of very bad teeth. To eliminate all such cases would markedly restrict the usefulness of evipan; to proceed with them would be to invite reactions, such as seen here and in other patients with similar physical handicaps. In a bed patient, of course, such recovery would be entirely satisfactory. Tonsillectomy under evipan was highly satisfactory to the patient, but required extra cooperation from the surgeon. In four cases of easy dissection, the operation was completed with full relaxation. The remaining nine cases were prolonged by scars and tags of previous operations or quinsy. Three patients did not relax fully, but operation was possible. Six were satisfactorily relaxed for from two to four minutes, but the final stages were performed with objectionable gagging and coughing. In simple cases, and with a skilled surgeon, evipan offers the patient who refuses local anæsthesia a procedure possessing much of the safety of ether without its unpleasant features. As a routine, however, it is not likely to supplant the older methods.

(E) Medical use: control of paroxysms of tetanus (1). This case was treated in conjunction with the medical staff, and illustrates the possibilities of the drug. A search of the literature (in English) reveals no previous report of such use of evipan. The rôle of any sedative in tetanus is to remove the strain of the spasms from an already overtaxed heart until such time as the antitoxin can overcome the constantly forming toxin. In this case, 21 c.c. of evipan in 8 hours controlled the spasms (and prevented death in one) but even 130,000 units of serum were insufficient to neutralize the toxin and death ensued. There were a concurrent lobar pneumonia, a pleural effusion, and secondary anæmia. No source of infertion was found, but it was presumed to be associated with delivery, three weeks previously. This woman, aged 31, was admitted with lobar pneumonia in a grave condition. On the sixth day muscle spasm and trismus developed, which, in a few hours, progressed to the point of actually endangering her life from asphyxia. Despite massive doses of serum and all routine treatment, the paroxysms became almost continuous; within half an hour, there were three spasms of the jaws and larynx, in which death was momentarily expected from asphyxia. As a last resort, evipan was given at the very onset of the next attack. In 30 seconds she was completely relaxed. Following 5 c.c., there was nothing more severe than minor twitching for an hour and a quarter, at which time a further 4 c.c. gave almost complete relief for 45 minutes. These doses were unnecessarily large, since each time there appeared shallow, sighing respirations, typical of fourth stage anæsthesia. So desperate had been her condition before injection, however, that even this type of breathing was relatively satisfactory. From then on she was not allowed to develop a severe spasm: at the first sign, 1 c.c. was injected, followed in a matter of seconds by relaxation lasting about 30 minutes. In 6 hours, 8 such doses were given, reinforced by a single dose of 3 c.c. This method controlled each spasm at its onset, by a dose which was kept at a minimum by the almost instantaneous action. Death was not due to asphyxia, as seemed inevitable at one time. Good results have been reported with avertin, sodium amytal, and nembutal, but the danger of overdosage would appear greater, since they lack the immediate action which allows evipan to be used in small amounts, repeated as necessary.

In some respects, evipan has fallen short of our expectations; in others, it has exceeded them. After four months' trial, we believe that there are still more fields of usefulness for it. Possibly we have acclaimed it too rapidly, with the enthusiasm of inexperience; perhaps, though, the anæsthetist who condemns it untried will find himself shortly without the aid of a most useful accessory in catering to the comfort of his patient and the needs of the surgeon.

AGRANULOCYTIC ANGINA FOLLOWING INGESTION OF DINITROPHENOL.—S. Stephen Bohn refers to a patient who developed agranulocytic angina after the ingestion of 21.8 g. of 2, 4 dinitrophenol sodium over a period of four months. The dosage was 4 mg. per kilogram of body weight daily for two weeks and then doubled until the onset of unfavourable reactions. Treatment consisted of discontinuing the drug, administration of pentnucleotide, and one transfusion of 250 c.c. of whole blood, following which the patient recovered.—*J. Am. M. Ass.*, 1934, **103**: 249.

THE GRADING OF MALIGNANCY IN TERMS OF THE CYTOMORPHOLOGY OF THE BLOOD*

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IT is usually considered as finally settled that there is no distinctive blood-picture in malignant disease. Since the hæmogram simply constitutes a sign of morbid processes (Schilling), especially in relation to their effect on hæmopoiesis, the observer can only record the effects of such complications of the cancerous process as sepsis, hæmorrhage, myelometastasis. Following Morrison,[1] the blood-picture produced by these effects may be classified into stimulative, irritative, infiltrative, and destructive or myelophthisic types. In doing so there would seem to be no room for any distinctive formula to justify a routine blood-count in cancer cases. It is however possible to arrange the variations simply into cytomorphological reactions of varying degrees of intensity. They may be slight, moderate, marked, or well-marked. That is, the blood condition can be graded, just as neoplastic tissue can be graded, according to cytological characters, though the two series of grades necessarily do not correspond. The hæmatological grade is found to vary from time to time during the course of the disease, and may even regress under the influence of beneficial treatment. Some 250 cases have been graded in this manner, using the following method.

METHOD

The procedure is as follows. Ordinary blood-films are made and stained either with Pappenheim-panoptic or by Leishman stain.

The latter is very simple. 0.1 grm. of the dye is dissolved in 10 c.c. of absolute acetone-free methyl alcohol. Let this stand (preferably in a resistance glass bacteriological corked test-tube) for 24 hours. This stain keeps indefinitely. With a pipette apply a few drops of stain, cover with a Petri dish for thirty seconds. Then drop on an equal volume of distilled water, gently agitating in the hand till the two fluids have mixed properly. In ten minutes wash briskly under the tap, and dry with fluffless paper.

In doing the ordinary differential count it is necessary to specify the following, mentioned in order of importance: endothelioid monocytes (that is, those with non-hyaline cytoplasm); micro-lymphocytes (that is, small lymphocytes with scanty cytoplasm and trachychromatic nucleus); neutrophiles with non-partite nuclei, as against the others.

The following structural details are also noted, but not necessarily counted. In the neutrophiles, the presence or absence of "toxic" granulation; abundance or otherwise of nuclear bizarrerie; nucleolar content. In the monocytes a special search is made for azure-staining filamentous bodies—spirillar, noded, beaded, or even branching. These are presumably mitochondrial, though it is an open question whether they are not phagocyted bodies. They are so rarely seen in cases definitely non-malignant as to be of value in diagnosis.

It is an advantage to have an actual total count of the leucocytes. The condition of the red cells is also noted.

Each component of the picture is itself graded in order to reach the final result. Thus:

TABLE I.

	I	II	III	IV
Monocytes	Up to 250 per c.mm. say up to 3%	250–1000 8%	1000–2000 12%	2000 and over 15% and over
Total leucocytes	Up to 10,000	10–12,000	12–15,000	Over 15,000
Microlymphocytes	Below 400 per c.mm.			
Left-shift	25% unsegmented	25–30%	30–40%	Over 40%

The degree of monocytosis sets the starting-point of the grade, being interpreted as varying directly with the stage of the disease. This is based on the experience of the present series and of a preceding series of 200 cases. It is also in agreement with the findings of Medlar,[2] Roy Walker and Utz,[3] Sadi,[4] and

* Work done under a grant for Cancer Research contributed by an anonymous donor to the Department of Surgery, McGill University.

others.[5] The grade of monocytosis is therefore subjected to the influence of the other factors in succession, and the final result becomes the hæmatological grade. Leucopenia lowers the degree; leucocytosis raises it. Lymphopenia raises the grade, and a good percentage of lymphocytes lowers it. Absence of left-shift (Morrison's "asegmentopenia") lowers the grade. As to the cell-details, toxic granulation raises, nuclear bizarrerie raises, and the presence of mitochondrial bodies in many mononuclears also raises the degree. Absence of all three lowers the degree, even to an interpretation as "negative", or "quiescent" (in cases which have been operated on or irradiated). The final grade which is reached in this way is recorded as I to IV. Two examples will serve to illustrate the procedure: (a) monocytes III, leucocytosis III, lymphopenia, left shift I; the other cell-details all present; conclusion—final grade IV; (b) monocytes II, leucocytosis I, lymphocytes not markedly diminished, no left-shift; mitochondria present; granulation absent, bizarrerie absent; conclusion—final grade II.

The variation of the chief components in this grading method which has been found in the different stages of the disease is shown in the following Table, which explains itself.

For an adequate interpretation of these figures it is of interest to consider what were the kinds of malignant disease studied. The several components of the grading do not move to the same extent in all cases. Thus, a high degree of monocytosis was a feature in 21 per cent of the sarcomas, but only in 9 per cent of the epitheliomas. A high degree of leucocytosis was met with in 84 per cent of the epitheliomas, and in 58 per cent of the sarcomas, but only in 26 per cent of the cases occurring in the gastrointestinal tract. A marked lymphopenia was noted in 79 per cent of the sarcomas, in 67 per cent of gastrointestinal cancer, and 55 per cent of epitheliomas. Only 42 per cent of breast cancers showed this reaction, and 18 per cent of cases of cancer of the cervix. Absence of left-shift was found in 82 per cent of the latter type of case, 65 per cent of cases of breast-cancer, 57 per cent of sarcomas, and only 31 per cent of gastrointestinal cancer. Clearly, these differences can be accounted for on the usual hæmatological rules: as, for instance, sepsis is more liable to complicate some forms of cancer than others.

The following are the results obtained in a series of 138 cases in which the relations between the five components and the four hæmatological grades were worked out as percentage

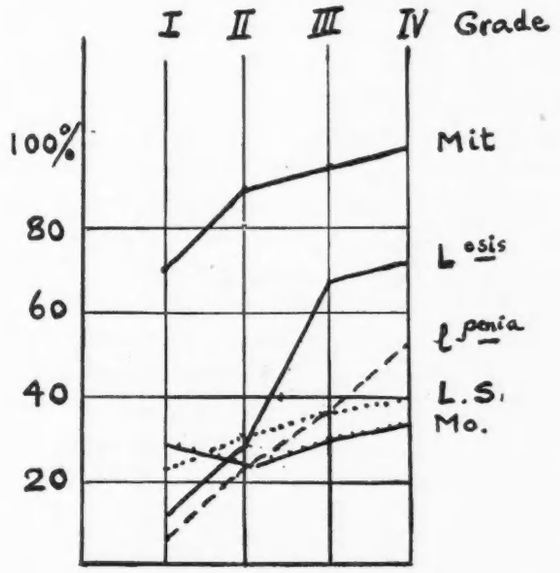
TABLE II.

PERCENTAGE FREQUENCY WITH WHICH THE COMPONENTS OF BLOOD GRADING APPEAR IN THE COURSE OF MALIGNANT DISEASE. (Cases of 1932-3)

	Clinically early cases	*Inoperable cases*	*Others*	*Clinically improved by radium*
MONOCYTES—				
Over 2000 per c.mm.	0	10	8	0
400 to 1000 per c.mm.	56	56	48	31
Under 400 per c.mm.	38	30	17	40
LEUCOCYTOSIS—				
Present	61	71	5	21
Absent	39	29	29	79
LYMPHOPENIA—				
Present	77	93	88	18
Absent	23	7	12	82
LEFT-SHIFT of Neutrophiles—				
Present	76	91	87	27
Absent	24	9	22	73
MITOCHONDRIAL BODIES—				
Present in	82	100	96	12
Hæmatological Grade	is I in 40%	is either III or IV in 91%		62% are "normal" ("no" grade)

values. Monocytosis of 1,000 per cmm. and over occurs in 30 per cent of grade I, 26 of grade II, 32 of grade III, and 33 of grade IV. Well-marked leucocytosis was found in 14 per cent of grade I, 29 of II, 69 of III and 72 of IV. Well-marked lymphopenia occurred in 7 per cent of grade I, 26 per cent of II, 37 per cent of III, and 52 per cent of IV. Decided left-shift occurred in 23 per cent of grade I, 32 per cent of II, 37 per cent of III, and 40 per cent of IV. Mitochondrial bodies were recorded in 69 per cent of cases in grade I, 91 per cent of II, 95 per cent of III, 100 per cent of IV.

These figures evidently show a progression parallel with the advance of the hæmatological grade. The accompanying graph throws this into greater prominence. There is not necessarily a parallelism with the clinical stages as well, for both third and fourth grades may be found associated with inoperability (see Table). It may be noted that similar gradations can be worked out in other slowly progressive diseases, such as tuberculosis. The principle is the same, and malignant disease manifests it clearly.



Graph illustrating the variations in percentage values of the components with the advancing grade.

SUMMARY

A method of interpreting the blood-count in malignant disease is described. The picture is expressed as a "grade" which corresponds in some measure with the extent of the disease.

Whether the changes are slight or marked depends in part on the character of the neoplasm, whether "open" (to vascular channels, *e.g.*, "active"), or "closed" (relatively quiescent; *e.g.*, owing to fibrosis), and in part on associated complications.

The *tout ensemble* of characters gives a result often very suggestive for diagnosis, even though none of them is in itself specific.

It is suggested, therefore, that periodic examination of the blood on these lines is desirable as a routine.

NOTE REGARDING THE APPLICATION OF CYTOMORPHOLOGICAL REACTIONS IN THE BLOOD TO THE DIAGNOSIS OF MALIGNANT DISEASE

While it is true that there is no specific change in the blood cell formula in cancer and sarcoma, it does not follow that a hæmatological study of the blood provides no help in the diagnosis of cancer. The following brief note is presented in order to gather together features which one considers sufficiently distinctive, when taken together. (Each feature, by itself, occurs of course in various other conditions).

Characters which speak strongly for presence of cancer. — Examination of fresh blood, by coverglass preparation. — (1) Strong "phlegmasic reaction". That is, (a) viscid blood; (b) heavy fibrin deposit; (c) no rouleaux; (d) well-marked "lakes" showing amœboid leucocytes; (e) abundant granular deposit; (f) tendency to hæmolysis in the red-cell groups. (2) Presence of doubly refractile granules and flakes, when viewed with crossed Nicol prisms. Examination of films, stained by the Leishman method.—(3) Abundance of monocytes, especially of the endothelioid type, and showing bizarre nuclei in many cases (8 per cent and over). (4) Presence of the intracellular bodies in these monocytes (nearly specific). (5) Great diminution of the trachychromatic lymphocytes. (6) Only moderate leucocytosis, the non-segmented nucleates being 25 per cent of the neutrophiles, or over. (7) Unusually thick nuclei in the neutrophiles, with bizarre contours and dark (toxic) granules; tigroid markings. (8) Either a well-marked hypochromic anæmia and changes of size and shape (without much change in the white cell formula), or hardly any abnormality of the red cells, (with obviously abnormal white cell formula).

Characters which almost certainly rule out cancer.—(a) Absence of 1 and 2 above; (b) a monocyte count of under 3 or even 4 per cent

(total count normal); (c) red cells normal, regular in size and shape and colour, without obvious abnormality of the white cell formula; (d) a neutrophilia of well over 80 per cent with leucocytosis and no abnormal monocytes; (e) a high absolute and relative count for small lymphocytes.

The *principles* are: study quality, not numerical data; appraise the count just as a clinician appraises symptoms; remember that the blood simply reflects interferences with the functional capacity of the organs, and that neoplasms themselves all behave in different ways, and may be relatively "quiescent" from the point of view of the blood, or may be "active".

It has been found quite definitely that any of the characters given in the above list *can* be met with even in early stages of the disease. This suggests that it is always worth while to practise this form of blood examination.

Grateful acknowledgment is made to the attending staffs of the Royal Victoria and Montreal General Hospitals for their kind coöperation in regard to their clinical material.

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THE POST-OPERATIVE ACTIVITY OF THE WHITE BLOOD CELLS AS MEASURED BY THEIR LIPID CONTENT

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WHITE blood cells have an important function in the resistance of the body to infection and certain intoxications. Many attempts have been made to utilize this function in the diagnosis and treatment of disease. The problem is: how may we obtain from the white cells information which will lead us to the diagnosis of a pathological condition, or foretell a condition that is imminent, or suggest a suitable form of treatment? This problem has led to innumerable studies on the blood leucocytes in health and disease. Fifty years ago, Metchnikoff, following his discovery of phagocytes, suggested that immune bodies in the blood plasma activated the white cells. Wright,[18] in 1904, conclusively demonstrated that these immune bodies (opsonins) acted upon bacteria and not upon the leucocytes. It became obvious that the activity of the white cells could not be determined from plasma analysis but required direct examination of the cells.

The white cells have been examined in a variety of ways — histologically by stained smears, physiologically by experiments with living cells, and chemically by analytical procedures. The first method has received by far the greatest amount of attention, the third method the least. Following the original studies of Arneth[2] and the later modifications of Papenheim[15] and Schilling[16] the nuclear "hæmogram" has come to assume a definite place in clinical laboratory procedures.[10, 11, 13, 17] The nuclear hæmogram furnishes information as to the age distribution of white cells present in the blood stream and presents an index of bone marrow activity following stimulation by the agents of disease in the body. Taken in conjunction with the total white cell count, it also suggests the rate of destruction of leucocytes, a "shift to the left" with a low total count indicating rapid destruction of the white cells and a diminishing resistance to infection. No information is obtained relative to the activity of cells already present in the blood, whether it is increased or decreased, or whether the younger cells have a greater immunological action than the mature forms.

Jonescu[12] has recently pointed out that, amid the popularity of nuclear studies, little attention has been paid to the cytoplasm of the blood

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leucocytes. This part of the cell may also present an altered histological picture in various diseases, including the infectious fevers, carcinoma, sepsis, etc. Two little known structures have been described, the vacuole-like bodies of Doehle[9] and the glycogen "clods" of Ehrlich. More information is available on the occurrence of fatty bodies ("sudanophilen Granula") and "toxic granules". Cesaris-Demel[8] has reviewed the earlier literature on the presence within the white blood cells of particles which take up fat stains, while the more recent contributions have been discussed by Boyd.[7] From the nature of their detection they must represent free glycerol fat or fatty acid within the cells. In the blood of normal individuals they are rarely found,[12] although such cells contain a considerable amount of lipid material when analyzed chemically.[6] The latter lipid must therefore be bound in the protoplasm and not demonstrable by fat stains.

Sudanophilic granules appear as irregular masses in the cytoplasm of white cells, which may or may not show degenerative changes in the nuclei. They occur with considerable regularity and extent in cases of tuberculosis, suppuration, and the infectious fevers. Persistence of sudanophilic granules in patients who have apparently recovered clinically signifies that the disease is dormant and, though inactive, will manifest itself later in the form of complications. They are therefore of considerable diagnostic and prognostic aid. These conclusions have been reached by Jonescu.[12] As previously discussed[7] these fatty granules are apparently closely related to oxydase and peroxydase activity. The so-called "toxic" granules may or may not be a form of fatty granules.[12] They have been discussed in detail by Mommsen[14] and are also found present during infection.

Very few studies on the functional behaviour of white blood cells have been extended to include cases where disease was present.[7] Under this caption the leucocytes have been investigated with regard to their metabolism, glucolysis, enzyme content, sugar and lactic acid content and electric charge.[1] At present these investigations offer promising lines of research but no data on the pathology of blood leucocytes.

The lipid or fatty content of the white blood cells has been previously reported in normal young women[6] and in women during pregnancy, lactation, and the puerperium.[7] It was noted in the latter study that following parturition a marked increase in phospholipid, free cholesterol, and glycerol fat in the leucocytes occurred in 3 to 4 days. These changes did not appear due as much to the cessation of pregnancy as to the response of the white cells to the infective processes introduced during and after delivery and to absorption and removal of degenerating tissue. Hence a series of lipid analyses were performed on the white cells of patients before and after surgical operations. The technique observed and precautions as to diet, etc., were as previously described[6, 7] while the procedure for determination of lipids was similar to that formerly used in the analyses of blood plasma lipids.[4, 5]

In compiling the data obtained it was noted that one group of cases presented figures analogous to those above for normal puerperæ, *i.e.*, rising values for most of the white cell lipids following operation. These patients all had normal, uncomplicated recovery from operation. The second group differed from the above in that the lipid curves, especially that for phospholipid, fell following operation. In this latter group the cases all showed post-operative complications of one sort or another and one death occurred. How can these facts be reconciled?

Bloor, Okey, and Corner[3] have demonstrated, by their own work on the corpus luteum of the sow, and by a review of the literature on other tissues, that activity in a tissue is accompanied by an increase in its phospholipid and free cholesterol, and generally also by a decrease in its cholesterol ester and neutral fat fractions. Decreased activity is associated with the reverse order of lipid changes. As will be shown below, the lipid changes characterizing active tissue occurred in the white blood cells post-operatively in those patients who exhibited a normal, uncomplicated recovery, while the reverse order of variations, characterizing degenerating and less active tissue, was found in the lipid content of leucocytes in patients who developed serious post-operative complications. It is therefore postulated that lipid analysis of the white blood cells offers a method of determining their activity. Its value as a diagnostic and prognostic aid will be emphasized in dealing with the individual cases below, but it should be noted here that progressive analyses during the course of

a disease are of more value than single examinations.

The patients whose case histories appear below were all women treated on the gynæcological divisions of the Strong Memorial Hospital. Blood for determinations of white cell lipids was obtained by venipuncture in the morning after a 15 to 16 hour fast. Following the classification discussed above, they may be conveniently considered under 2 groups, those with uncomplicated recovery following operation, and those with serious post-operative complications.

GROUP 1.—CASES WITH A NORMAL POST-OPERATIVE COURSE

CASE 1

(Unit No. 73,647). Mrs. A.J., a 40 year old woman who had passed through 3 full-term pregnancies, weighed 70 kilos and was 168 cm. in height. She complained of leucorrhœa and pain in the lower abdominal quadrants. Examination revealed the presence of a chronic cervicitis and chronic salpingitis. Cervical and urethral smears were negative for gonococcus and her blood Wassermann test was negative. Her temperature, pulse, and respirations were normal. Blood examination revealed 4,600,000 red cells per c.mm. and a hæmoglobin of 94 per cent, with 8,600 white cells per c.mm.

On April 24, 1933, three days after a menstrual period, she was operated upon under nitrous oxide and ether anæsthesia. A dilatation and curettage with a circular amputation of the cervix were performed. She withstood the operation well, and the next day presented nothing of note except the usual post-operative malaise and a slight elevation of her pulse. On the second day her temperature rose slightly to 37.8° C., but returned to normal next day, and from then on she had an uninterrupted recovery, with little bleeding or discharge.

The lipid content of her white blood cells was determined just before operation and upon the first, third, and eleventh days afterwards. The following values were obtained (expressed as mgrm. per 100 grm. of cells).

Days p.o.	*Total Lipid*	*Total Fatty Acid*	*Neutral Fat*	*Phospholipid*	*Total Cholesterol*	*Ester Cholesterol*	*Free Cholesterol*
0	1,445	1,025	638	627	180	0	180
1	1,747	1,158	580	907	260	0	265
3	2,055	1,238	339	1,370	346	0	375
11	2,498	1,490	600	1,380	518	0	552

The features of this case are that the patient exhibited an uncomplicated recovery, accompanied in the white cells by increasing values for phospholipid and free cholesterol, absence of cholesterol ester, and decreasing values for neutral fat. Since the results are expressed in mgrm. per 100 grm. of cells and not in terms of the number of cells per unit of blood, they represent changes in the chemistry of the cells and not merely the analysis of a greater number of cells occurring post-operatively. Some of the values for free cholesterol are higher than those for total cholesterol above, which is to be explained by the method of analysis for these two lipids.[7]

CASE 2

(Unit No. 64,088). Mrs. N.C., a 48 year old woman, para-9, who weighed 45 kilos and was 153 cm. in height. For many years she had complained of menorrhagia which had persisted in spite of operative (several dilatations and curettages) and hormonal treatments. Being near the menopause, she consented to an hysterectomy. Her general condition was normal and the blood Wassermann test negative. The red blood cell count was 4,000,000, hæmoglobin 80 per cent, and white blood cells 7,600.

On June 16, 1933, twelve days after her last menstrual period, a hysterectomy and appendectomy were performed under nitrous oxide and ether anæsthesia. For the first five days post-operatively she had a marked febrile reaction, due in part to a recrudescence of an old urinary bladder infection. She quickly recovered, however, the wound healed nicely, and she was discharged in good condition.

Blood was obtained for lipid analysis just before operation and on the first, sixth, and fourteenth days afterwards.

Days p.o.	*Total Lipid*	*Total Fatty Acid*	*Neutral Fat*	*Phospholipid*	*Total Cholesterol*	*Ester Cholesterol*	*Free Cholesterol*
0	1,894	1,195	583	731	426	230	196
1	2,856	1,673	0	2,360	395	150	245
6	2,294	1,550	965	897	397	53	344
14	1,640	913	305	902	417	24	393

It may be noted there was an increase in free cholesterol and a decrease in ester cholesterol from the day of operation. The awakening of an old cystitis and pyelitis was accompanied by a marked increase in phospholipid and decrease in neutral fat, which became reversed as the fever persisted. Following recovery from the fever the phospholipid was still higher than before operation and then continued to increase. These results may be interpreted as indicating a marked increase in activity of the white cells to the stimulus of the onset of cystitis. This was sufficient to overcome the infection, but resulted in some loss of white cell activity. Relieved from the function of combating the bladder infection, the white cell activity again increased and the patient went on to recovery without further untoward events.

CASE 3

(Unit No. 54,087). Mrs. J.B., a 33 year old woman who had had 4 full-term pregnancies, weighed 80 kilos, and was 155 cm. in height. She complained of menorrhagia and metrorrhagia and her general physical examination was negative. Her blood Wassermann test was negative, red cell count 3,780,000, hæmoglobin 68 per cent and white cell count 7,900.

A dilatation and curettage were performed on April 7, 1933, under nitrous oxide and ether anæsthesia.

Microscopic examination of the uterine scrapings revealed hyperplasia of the endometrium. Following a slight post-operative febrile reaction the patient recovered quickly from the operation.

Extractions of the white blood cells were obtained on the morning of the day of operation, the day after operation, and the sixth day after.

Days p.o.	*Total Lipid*	*Total Fatty Acid*	*Neutral Fat*	*Phospholipid*	*Total Cholesterol*	*Ester Cholesterol*	*Free Cholesterol*
0	917	478	35	665	217	0	219
1	1,035	542	79	697	259	0	268
6	1,900	999	28	1,460	412	0	418

This case, which represents the white cell response to a minor operation with rapid recovery, is analogous in its lipid changes to Case 1. There occurred an increase in phospholipid and free cholesterol, with small amounts of neutral fat and no cholesterol ester throughout. These changes correspond to an increase in the activity of the blood leucocytes.

CASE 4

(Unit No. 80,035). Mrs. M.S., a 46 year old woman, who had had three normal full-term pregnancies; weight 72 kilos; height 163 cm. She complained of profuse bleeding during menstruation, and on examination was found to have a myoma uteri, with marked hypochromic anæmia. She was given two blood transfusions to restore her lost blood, and before operation was found to have a red cell count of 3,600,000, hæmoglobin 66 per cent, and white cell count of 4,400.

On September 29, 1933, three weeks after her last menstrual period, a hysterectomy was performed under nitrous oxide and ether anæsthesia. Following operation her temperature rose to 38.5° C., but by the fifth day post-operatively had returned to normal, with a white cell count of 11,550 (85 per cent neutrophiles). From then on she had an uninterrupted recovery, was allowed up on the fifteenth day post-operatively, and discharged a few days later in good condition.

Samples of blood for analysis were removed on the day of operation, and five and fifteen days following operation.

Days p.o.	*Total Lipid*	*Total Fatty Acid*	*Neutral Fat*	*Phospholipid*	*Total Cholesterol*	*Ester Cholesterol*	*Free Cholesterol*
0	2,763	2,050	1,460	823	366	108	258
5	3,550	2,470	1,740	950	700	152	548
15	2,666	1,350	178	1,070	950	444	506

This case is analogous to those preceding in that, coincident with an uninterrupted post-operative course, the phospholipid and free cholesterol content of the white blood cells rose. There was also an increase in cholesterol ester throughout. After a slight increase on the fifth day post-operatively the neutral fat level fell. This patient may be considered to have had increased activity in her blood leucocytes, as indicated by their lipid content.

CASE 5

(Unit No. 41,706). Mrs. E.R., a 37 year old woman, para-3, with a weight of 53 kilos and a height of 162 cm. This patient came to the hospital complaining of a moderate sized cystic growth on her vulva. She was found in addition to have an old laceration of the cervix with chronic cervicitis. Blood examination revealed red blood cells 4,030,000, hæmoglobin 90 per cent, and white cells 8,000.

On October 5, 1933, three weeks after her last menstrual period, she was operated upon, a dilatation and curettage, Emmets' repair of the cervix (partial) with cauterization of the remaining cervix and removal of the vulvar cyst being done under nitrous oxide and ether anæsthesia. Her post-operative course was uneventful. She was discharged on the tenth day after operation with the vulva and repair well healed, although the slough had not quite separated from the cervix.

Blood was obtained for lipid analysis before operation and on the third and ninth days following.

Days p.o.	*Total Lipid*	*Total Fatty Acid*	*Neutral Fat*	*Phospholipid*	*Total Cholesterol*	*Ester Cholesterol*	*Free Cholesterol*
0	1,982	908	48	1,045	726	249	477
3	901	378	0	417	369	172	197
9	958	466	103	404	353	147	206

The findings in this case are unlike those cited above. The only data suggesting activity are the decreasing values for cholesterol ester. The curves for phospholipid and free cholesterol indicate decreased activity. Yet the post-operative course of this patient was without incident. It may be, of course, that the other factor in infection, the infecting organism, may have been absent or without influence. The lipid changes are analogous to those in Case 8 below and it is probable that had patient No. 5 been subjected to a second operation, her subsequent course would have been stormy as in Case 8.

CASE 6

(Unit No. 80,668). Mrs. F.S., a 29 year old woman, with three previous pregnancies; weight 51 kilos; and height 151 cm. She came to the hospital with a self-induced abortion, incomplete, upon a pregnancy of about 3 months' duration. Her red blood cell count was 3,200,000, hæmoglobin 86 per cent, and white cell count 8,800.

She had been bleeding for 5 days when she was operated upon and the abortion completed under nitrous oxide and ether anæsthesia. Her post-operative course was uneventful.

The lipid content of her white blood cells was determined just before operation and on the third and sixth days afterwards.

Days p.o.	*Total Lipid*	*Total Fatty Acid*	*Neutral Fat*	*Phospholipid*	*Total Cholesterol*	*Ester Cholesterol*	*Free Cholesterol*
0	3,840	2,273	0	2,960	577	452	125
3	3,880	2,233	0	2,850	697	497	200
6	3,844	2,192	48	3,140	518	206	312

This case varies from those preceding in that at the time of operation the phospholipid content of the white blood cells was very high, almost 3 per cent, indicating a marked activity of the leucocytes. This was probably due to the onset of abortion 5 days before operation. Following operation there was very little change in the lipid composition although the free cholesterol especially, and the phospholipid slightly, rose in value.

GROUP II.—CASES WITH POST-OPERATIVE COMPLICATIONS

In the group of 6 cases reported above all the patients recovered normally from operation, and were discharged from the hospital in good condition within the usual time interval. On the contrary, the group of 3 cases to be described below, all exhibited some complication of serious note following operation. One patient had a persistent separation and infection of the operation wound (perineal) which required two months to heal. Two others developed post-operative broncho-pneumonia and one of these died.

Just as the clinical course in Group I lead to recovery of normal health, while in Group II a prolonged illness or serious complications followed operation, so the lipid composition of the white cells differed. In Group I following operation the phospholipid and free cholesterol rose in value, while cholesterol ester and neutral fat had low or descending values. On the other hand, the cases in Group II below exhibited declining values for phospholipid and free cholesterol and higher ascending values for neutral fat and cholesterol ester, the exact opposite. As discussed above, the white cells in Group I presented lipid changes corresponding to increased tissue activity, while the white cells in Group II corresponded to decreased tissue activity. As a result we should expect to find a decreased resistance of infection in Group II, which was precisely the situation encountered.

CASE 7

(Unit No. 1,315). Mrs. L.L., a 35 year old woman who had had 9 pregnancies, somewhat obese, with a weight of 73 kilos and a height of 153 cm. She came to the clinic with marked relaxation of her pelvic floor, a cystocele and rectocele. Blood examination revealed red cell count 5,909,000, hæmoglobin 88 per cent, and white cells 9,700, with a negative Wassermann test.

On April 7, 1933, three weeks after her last menstrual period, she was operated upon and a complete repair performed, with radical cure of the cystocele and rectocele and a perineorrhaphy, under nitrous oxide and ether anæsthesia. For the first 5 days following operation she had a mild febrile reaction. Separation of the wound with a marked discharge was noted on the seventh day post-operatively. The discharge was examined for *Trichomonas vaginalis*, but none was found. The separation and discharge persisted in spite of cleansing douches. On the nineteenth day she was allowed to go home, with instructions to use douches twice daily. In the out-patient department she received douches and caustic applications, but it was not until June 7, 1933, two months after her operation, that the perineum was finally pronounced healed.

The white blood cells were examined just before operation and on the first and tenth days afterwards.

Days p.o.	*Total Lipid*	*Total Fatty Acid*	*Neutral Fat*	*Phospholipid*	*Total Cholesterol*	*Ester Cholesterol*	*Free Cholesterol*
0	1,668	961	0	1,375	252	61	191
1	1,188	808	515	428	217	41	176
10	1,905	1,494	1,240	444	202	28	174

The day following operation there occurred a marked fall in the phosopholipid content of the white blood cells with a smaller decrease in free and ester cholesterol. Neutral fat became markedly elevated possibly due in part to the white cells acting as scavengers, removing fatty material from the site of the repair. On the tenth day the neutral fat was still high while phospholipid and free cholesterol were low.

These changes are similar to those for inactive tissue, the white cells offering little resistance to the infection of the perineal wound which was by this time well established.

CASE 8

(Unit No. 7,635). Mrs. S.S., a 66 year old woman, with three former pregnancies, who weighed 72 kilos and was 164 cm. in height. On examination she was found to have a relaxed pelvic floor with a cystocele, rectocele, and procidentia. She also had a myoma uteri and an ovarian cyst. Menopause had occurred at the age of 48. Her blood had a red cell count of 4,400,000, hæmoglobin 95 per cent, and white cells 6,200.

Two operations were advised. The first, performed on June 17, 1933, consisted of a radical cure of the cystocele and rectocele with a perineorrhaphy and repair. From this operation the patient made an uninterrupted recovery clinically. On June 29, 1933, the second operation, a laparotomy, was performed and the uterus, Fallopian tubes, ovaries, and appendages removed. The patient did not have a normal recovery from the second operation. On July 1, 1933, she developed a marked pain in the right side of her chest which became worse. Her general condition gradually declined, and on July 22, 1933, she died. At autopsy she was found to have pulmonary emboli with infarcts, a fibrinous pleurisy and pericarditis, chronic myocarditis and cystitis, and general arteriosclerosis.

Extracts of the white blood cells were obtained only during the post-operative course of the first operation.

Days p.o.	*Total Lipid*	*Total Fatty Acid*	*Neutral Fat*	*Phospholipid*	*Total Cholesterol*	*Ester Cholesterol*	*Free Cholesterol*
0	3,951	1,490	2,018	1,463	432	57	375
1	3,630	2,610	1,760	1,301	500	103	397
5	3,309	2,625	2,110	878	289	48	241
15	3,487	2,760	2,650	354	483	0	495

These changes are the exact opposite of those for the cases in Group I, and suggest that following the first operation the white blood cells of this patient became progressively less active. Thus the phospholipid level fell continuously, while the free and ester cholesterol showed but slight fluctuation, one way or the other. Throughout the white cells were loaded with neutral fat.

CASE 9

(Unit No. 80,579). Mrs. E.S., a 70 year old woman, para-2, somewhat thin and obviously ill. She had lost considerable weight and strength during the few months previous to admission to the hospital. On examination she was found to have a mass in the left ovarian region, and a diagnosis of malignant ovarian tumour was made. Her temperature was normal and her blood count showed 5,160,000 red cells per c.mm. and 8,400 white cells.

On October 2, 1933, a laparotomy was performed, and the pelvis found to contain tissue masses of a malignant nature, involving the uterus, appendages, bowel and rectum, in addition to the ovary. The left ovary, being free, was removed, but the malignant tissue was not touched. Following operation she appeared in good condition until the ninth day, when she developed a broncho-pneumonia. This persisted for 10 days with a marked febrile reaction. The patient finally recovered from the pulmonary infection, but was left with a senile psychosis and was transferred to a private nursing home on the thirty-first day after operation.

The white blood cells were examined before operation and on the first, fifth, and thirteenth days afterwards.

Days p.o.	*Total Lipid*	*Total Fatty Acid*	*Neutral Fat*	*Phospholipid*	*Total Cholesterol*	*Ester Cholesterol*	*Free Cholesterol*
0	2,319	1,390	642	605	694	565	129
1	1,798	975	121	797	552	489	63
5	1,906	1,510	1,004	267	590	513	77
13	2,274	1,730	1,390	411	337	202	135

It may be noted that on the fifth day following operation the white cells presented a picture of decreasing activity, as evidenced by falling values for phospholipid and free cholesterol and high levels of neutral fat and cholesterol ester. This state of affairs preceded the onset of broncho-pneumonia. A sample of blood was obtained during the height of the lung infection when clinically it was considered the patient was on the verge of death. Analysis revealed lipid changes which suggested a partial recovery of white blood cell activity, *i.e.*, slightly rising levels of phospholipid and free cholesterol, with lower values for cholesterol ester. Actually, as stated above, the patient did recover from her attack of broncho-pneumonia. On account of her weakened condition no further tests were made.

DISCUSSION

The present series of cases has been presented in the hope it may offer a new means of determining the function of white blood cells. Lipid analysis of blood leucocytes before and after surgical operation has revealed that the level of these lipids varies. Variation in one direction occurred in those cases which had a normal post-operative course, while an opposite set of changes characterized those cases with a prolonged post-operative course and severe complications. Briefly, as emphasized above, a normal post-operative course was accompanied by increasing levels of phospholipid and free cholesterol and, in most cases, diminishing or low values for neutral fat and cholesterol ester. By reviewing the clinical record of the patient, and from the lipid analyses of the white cells, it is evident that these leucocytes exhibited increased activity following operation. Lipid analyses of these cells correspond to the lipid changes in other body tissues undergoing activity. On the other hand, when the clinical record of the patient was one of delayed recovery from operation, with various complications, lipid analysis of the white cells revealed an order of changes the reverse of that just described. The phospholipid level fell, free cholesterol fell or remained stationary, neutral fat usually increased, and cholesterol ester was often present in appreciable amounts. These changes likewise have been shown to take place when other tissues of the body became inactive or degenerate.[3] They indicate, therefore, decreased activity of the white blood cells, a fact which was evident in reviewing the clinical course of the patients.

The practical value of information to be derived from lipid analysis of the white blood corpuscles is that it may be possible to determine the activity of the leucocytes when such information is needed for prognosis or therapeutic purposes. Examples of such cases have been given above. Case 8 was that of a woman who required two operations. Analysis of the white cells following her first operation revealed lipid values corresponding to a decrease in activity, although clinically she appeared to have a normal recovery. A second operation, performed two weeks after the first, was followed by a

stormy clinical course and eventually the death of the patient.

An analysis of all the lipids present in the white blood cells, as used in the above cases, is a procedure of some length. Collecting a sample of fasting blood in the morning it would be barely possible to have the analysis completed by night. For routine use, a method somewhat less cumbersome is preferable. With this in mind, the results given above were analyzed, to determine whether or not the procedure could be shortened to the estimation of one single lipid and yet the necessary information be obtained as to leucocytic activity. The salient feature in the above lipid analyses of white cells in patients with a normal post-operative course is a rising value for phospholipid. In the other group of cases, with complicated recoveries and apparently low resistance, the phospholipid of the white cells fell in value. Phospholipid determinations alone, therefore, will yield all the necessary information, which is only supplemented by further analyses of the other lipids present. Bloor, Okey, and Corner,[3] in their work on the corpus luteum, have stressed that a rising value for phospholipid appeared to distinguish most the lipid composition of the active tissue, and, *vice versa,* a falling phospholipid level, the inactive tissue.

The phospholipids are a group of fatty substances which include lecithin, cephalin, and sphingomyelin. They appear to be essential elements of all cells and necessary to life. They are synthesized in the body and have a variety of functions. Thus they may act in the transfer of fat and appear to be antagonistic in certain reactions to cholesterol. In the present investigation they were determined oxidatively, but they may also be estimated by analyzing the phosphorus content of the alcohol-ether extract, the lipoidal phosphorus. The method as herein used for the estimation of the phospholipids in white blood cells may be briefly outlined. For details previous communications may be consulted.[4 to 7]

Twenty-five to 30 c.c. of fasting blood are centrifuged, the white cell layer removed, weighed, and heated with a mixture of alcohol and ether to extract the lipids. After filtering off the precipitated proteins, the filtrate is evaporated and the residue extracted with ether. From this purified extract, the phospholipids are precipitated with acetone and magnesium chloride. After pouring off the mother liquor, the precipitate is dissolved in moist ether, the solution transferred to a glass-stoppered flask, the solvent evaporated off and the lipid oxidized with chromic acid. The amount of oxidizing agent required for this purpose is determined by thiosulphate titration of the excess oxidizing mixture. The whole procedure, including separation of white cells, extraction, and analysis, may be performed in three to four hours.

SUMMARY

A differential lipid analysis of the white blood cells was performed on 10 patients before undergoing surgical operation and at intervals of 3 to 7 days afterwards. In one group of 7 cases the post-operative course was normal; in the second group of 3 cases the post-operative course was prolonged, due to serious complications, and 1 death occurred.

The changes in the lipid content of the white blood cells varied according to whether recovery from operation was normal or complicated. In those patients who returned to normal health in the usual time the striking changes in the blood leucocytes were a rise in the level of phospholipid and free cholesterol (in certain cases an increase of over 200 per cent was recorded for these lipids). In such leucocytes the values for neutral fat and cholesterol ester were usually low. On the other hand, when the patient did not respond normally to operation and had marked post-operative complications, the changes in the leucocytes were the exact opposite of this; phospholipid and free cholesterol fell to a third or a half their value before operation and neutral fat and cholesterol ester tended to increase in amount. The group of variations in lipids for the former cases corresponds to those characterising increased tissue activity; those in the latter group, decreased tissue activity.

It is therefore possible to follow changes in the activity of the blood leucocytes by measuring their lipid content. The most significant variations occur in phospholipid and free cholesterol and routine analyses may be restricted to one or both of these. The test may readily be performed in about three hours. Its use as an aid to prognosis, diagnosis, and treatment has been discussed and illustrative cases cited.

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SOME REFLECTIONS ON ARTHRITIS

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MOST persons over 40 have had at some time treatment for arthritis. This affection may have manifested itself as backache, sciatica, painful feet, etc. X-rays may have confirmed its presence. The treatment given by their physicians has, quite rightly, been directed against the arthritis, and has probably lasted for months and often years. These people are arthritic; they admit it themselves; and their physician is apt to take their diagnosis for granted. Any joint pain or disability they may complain of for the rest of their lives is almost sure to be attributed to arthritis and to arthritis alone. It is in this way that errors of diagnosis creep in, with consequent failure to obtain a cure. There is disappointment on the part of the patient and of the physician. It is on account of these errors that the present article is written. An attempt is made to aid in the diagnosis and hence in the treatment of actual, usually chronic, arthritis. It will be noted that chronic arthritis is probably most often confused with chronic joint strain. This joint strain may coexist with the arthritis, or it may be its successor. Its treatment, it need hardly be pointed out, is entirely different from that of arthritis. Joint strain is mechanical in its origin and largely mechanical in its treatment. Most of the errors concerning arthritis are made as follows.

1. The original diagnosis of arthritis may be wrong. This may be exemplified by the common error in treating a chronic Brodie's abscess in the lower end of the tibia as arthritis of the ankle. An acute osteomyelitis at the lower end of the femur may be mistaken for arthritis of the knee joint, with disastrous and even fatal results. Another very common error is to treat as arthritis a backache due to flat feet. It is obvious that aspirin or the removal of teeth and tonsils, etc., will not relieve the backache, but support to the flat feet and the pelvis will have the happiest results. (It is perhaps permissible here to insist that the feet should always be examined with the patient standing, in cases of backache).

2. The existing arthritis under treatment may be associated with disability of mechanical origin. It is, for example, common to find flat feet associated with arthritis. Such feet need treatment for the arches (*i.e.*, support) as well as for the arthritic element, otherwise they may remain painful. It is to be noted, too, that arthritic feet quite often show weakness of the arches. To strap a patient's flat foot is good treatment; to overlook a gonorrhœal infection in the same foot is to do injury to one's reputation.

3. The arthritis may have burnt itself out and be a thing of the past, but may have left mechanical disability (joint strain) in its train. This joint strain may succeed the arthritis without appreciable interval, or may make its presence known at a later date. Such disability (*e.g.*, sacro-iliac strain, fat fringes within the knee, flat feet, etc.) is almost sure to be diagnosed, wrongly of course, as more arthritis. If

x-ray's reveal arthritic lipping this error is still more certain to occur. It is forgotten that the x-ray changes last a lifetime, while arthritis not infrequently comes to an end, either spontaneously or under treatment. The focus of infection is removed, or disappears, temporarily or permanently, with disappearance of the arthritis.

It may be asserted that in the study of chronic joint pain there are three main possibilities as to etiology—(1) arthritis; (2) mechanical disability or joint strain; (3) arthritis plus mechanical disability. In fact, if no mechanical source of pain is to be found in a joint (such as the spine or foot) it is likely, by process of exclusion, that the trouble is arthritic in origin. Both however may be present, and if so both need attention.

A low backache, for example, in a man with lipping in his spine and restricted and painful lumbar movements, comes up for diagnosis. The x-ray shows that arthritis is or has been present. But is it active? It is well known that a stiffened lumbar spine throws an excessive amount of strain on the sacro-iliac joints. How do we know that part of his trouble, at least, is not sacro-iliac strain? Also, his feet may be weak, or even flat; it is well known that weak feet may cause a low backache. His pelvis is accordingly strapped tightly with adhesive plaster and his weak feet are also supported. All strain is thus removed. If this relieves his backache, (and it often does) it means that he does not have to lose his teeth and tonsils. Many unhappy sufferers from backache are treated with unnecessary cruelty for no other reason than that x-ray shows that lipping has existed from a bygone day; all they needed was support to the feet and sacro-iliac joints. Strapping the pelvis for sacro-iliac strain is invaluable, both as a diagnostic test and as treatment. It will relieve a relaxed joint at once, but will not do much good to an inflamed one. It may indeed make it worse. The strapping should go around the back at a level between the anterior superior spines and the great trochanters. It should at least be the width of a hand and applied tightly. The strapping should be so low that sitting in a low chair is somewhat uncomfortable. If its use is helpful it may be followed by a sacro-iliac support. A woman may have a strap and buckle attached to her corset at a low level, to go around her hips.

Now suppose a patient with an arthritic history has hip pain or ache, and yet shows no appreciable limitation of motion in the joint. The pain disappears on recumbency. What can it be due to? Must it be due to arthritis? In the first place the pain may be a referred one, such as a sciatica back of the joint or an anterior cruralgia in front of it. The sciatic pain will point to a lesion (usually an arthritis) in the region of the lumbo-sacral junction, while the anterior cruralgia, which is not nearly so common, indicates trouble in the upper lumbar region. Any gross mechanical defect in the leg, most commonly a flat foot, but also a knock-knee or short leg, is capable of causing a painful hip. Strap the foot in inversion as an experiment. If the pain is relieved an arch support may be used. The diagnosis will be hip strain caused by flat foot. Sometimes a badly damaged and stiffened hip is complained of, for which little relief can be promised, short of operation. Fortunately for the patient it is occasionally found that the pain is not after all in the hip—but is the result of a sacro-iliac joint strained to sensitiveness by the adjacent stiffened hip joint. Here strapping the pelvis will at once clear up the diagnosis and afford relief. It should be followed by a sacro-iliac belt.

In the knee there are several disabilities of mechanical origin to be looked for as simulating an active arthritis. Errors in diagnosis are consequently frequent. A tender and painful internal lateral ligament may exist, the result of flat feet or knock-knee. This pain will yield to raising the inner side of sole and heel, or to an arch support. A brace may at times be needed for the relief of a painful knock-knee. Hypertrophied infrapatellar fat pad, known also as fat fringes, is a common finding. This condition may be caused originally either by arthritis or injury. It has a tendency to perpetuate itself long after the arthritis has died away. Weight-bearing traumatises the fat fringes between the femur and tibia and keeps them swollen and tender. It is characterized by fullness, pain and tenderness below the patella. There is pain here on forcing the knee into full extension. Raising the heel half an inch to keep the knee flexed, together with a bandage and physiotherapy, often cures it. If not, the fringes

may be removed by operation with good result.

It is interesting to note that pain and tenderness in the knee, the result either of chronic arthritis or of fat fringes, is quite frequently and wrongly attributed to a displaced semilunar cartilage, especially when the pain comes on after some twist of the knee. In the case of arthritis there is pain and tenderness at the inner joint line, and this by the situation of the pain is mistaken for cartilage injury or displacement. In the case of fat fringes, a condition which is indeed a form of internal derangement of the knee joint, one finds fullness and tenderness below the patella, together with limited and painful extension. These signs are also thought to indicate semilunar cartilage trouble. As a matter of fact, in fat fringes the tenderness and fullness are most often to the outer side of the patellar tendon. The commoner form of cartilage injury, on the other hand, shows tenderness to the inner side of this tendon. Both conditions show limited extension.

The knee joint often suffers and becomes sensitive in a patient with ankylosis of the hip on the same side, as following hip disease. The reason is, of course, that undue strain is thrown on the knee, as the hip does not function. Lipping may even occur, but this condition is not to be attributed to infection so much as to improper mechanical function, the so-called static arthritis. Such a knee will naturally not react to vaccine or to the removal of any focus of infection.

In the foot the problem is quite interesting. A flat foot is easy to diagnose, but how is arthritis to be recognized if present as well? Mechanical disability and arthritis coexist frequently in the feet.

A flat foot without arthritis will (1) be complained of under the scaphoid and up over the ankle, and (2) will yield at once to strapping, or wrenching if spastic. It will show no swelling and there will be no pain in other parts of the body. It responds quickly to treatment. If it does not do so arthritis may be suspected. Pain and tenderness around the heel, in the soft parts of the sole and along the outer border of the foot, are almost always due to arthritis. Metatarsalgia is often due to arthritis, and swelling of the toes, foot or ankle settles the question.

If arthritis is found it means a search for infection and removal of this if possible. Vaccine is a great help, especially when the pains persist after all foci have been dealt with to the best of our ability.

One of the most important features therefore of an examination of a patient sent with the diagnosis of arthritis is to determine if possible how much of his disability is really due to arthritis and how much to other conditions. *Per contra,* the presence of arthritis in any joint condition makes such an enormous difference in its prognosis and treatment that the greatest pains should be taken to ensure that it be not overlooked.

THE SEMILUNAR CARTILAGES OF THE KNEE

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THROUGHOUT Canada, during a year, a great number of cases of injuries to the knee must occur. Our medical journals carry very little information in reference to this most vital joint, and practically no reports as to the end results in traumatic cases. This is not the fault of the editors of the journals, but the fault of the surgeons.

In my opinion the most important structures of the knee joint are the semilunar cartilages, and it would be advisable at some later date for some one to make a complete study of these. Most of the information as to injuries, the method of treatment, medical or surgical, and the end-results, could, no doubt be secured from the records of the Workmen's Compensation Boards of the different provinces, and from hospitals and accident insurance companies. Following an examination of a knee joint that has been injured, and with a history of recurrent pain well localized, with or without locking of the joint, with or without swelling of the knee, but with a history of pain when using the leg, and with a negative x-ray report, one has to determine the nature of the injury. If a consultation is held between a number of surgeons,

one is struck by the lack of agreement as to the exact diagnosis and the method of treatment suggested by each, which shows that as yet it is hard to make a correct diagnosis, and, consequently, treatment is often haphazard.

During the past few years I have examined and attended quite a number of knee cases caused by minor and major injuries, and as a result have formed some definite opinions as to the time for operation in operative cases. I am submitting a complete report of a number of cases operated on by myself, with the end results, which may be interesting; all were operated on during a period of one year. First, I wish to state that the x-ray report is often stated to be negative, but on examining such films one frequently finds that the joint cavity will give an appearance as if a sponge had been thrown on it. This, in my opinion, means that much soft inflammatory tissue is present. In such cases I operate, and I almost always find much inflamed infrapatellar fat present, with a thickened inflamed capsule and ligamentum mucosæ, in addition to a loose or fractured semilunar cartilage or cartilages.

The operation gives relief at once from pain, provided you remove all the damaged structures. In operating I use three or four skin preparations, with, preferably, iodine and sterile dressings for a period of thirty-six to forty-eight hours. If this preparation is carried out correctly you do not need any special skin towels during operation. I flex the knee over the operating table, then apply the tourniquet (or do so before flexing the knee) half way to hip, following which I make a curved incision, starting at the upper inner or outer end of patella and carry this downward to just below the joint, then I curve it backwards towards either the external or internal lateral ligament, and reflect the tissue to the capsule. I note the condition of the capsule, whether it is loose or not, and when suturing it afterwards I take this into consideration in judging the degree of tension to give the closed capsule. After opening the capsule I remove all the inflamed tissue present and the whole semilunar cartilage, if at fault. Very frequently the inflamed tissue or the loose capsule may be the greatest cause of pain. I do a complete operation when I open the joint and leave no traumatized tissue behind. I have had remarkably good results.

The prognosis is excellent in the young and middle-aged, good in those past middle age, but you must caution the patient if past middle age, about the liability to arthritis.

The question of when to return to work is important. I keep the patient in bed for ten days, until the incision is well healed, using a flannel bandage as a supporting splint; then I allow him up on crutches in two weeks and the full use of leg in three or four weeks, with return to work in three months. Dr. R. Brooke, of England, allows his patient out of bed and to walk with crutches on the second day, and bending the joint on the sixth day; on the tenth day the wooden splint is removed and a rubber Esmarch bandage applied, and the patient returns to work on the fourteenth day. I may state that such a bandage, worn for five or six hours when constantly on the feet, causes great distress behind the knee and one is compelled to remove it. I have worn such bandage on my own knee and know the distress it causes under such conditions. I have seen many knees, and have never seen a knee fit for ordinary labouring work in two weeks. I would be afraid of the after-results, the arthritic changes which may occur. I would like to hear from some one who may follow this routine as to the end-results, say, in one year or more. The question of return to work is vital to the workman and employer, as to the future usefulness of the knee to the workman, and as to the monetary aspect to the employer.

During the year referred to, I have operated on 18 knees. I am giving case reports of 12; the other 6 would only be repetition.

CASE 1

T.T., had an accident to the left knee in 1927, by striking it against a locomotive. He continued work, shortly afterwards went on holidays, and the knee became painful. The patient was then confined to bed and received treatment by an osteopath, under whose care he became steadily worse. When a physician was called he was placed in bed and the leg splinted. After three months he returned to work, but the knee continued to pain him. In March, 1931, he fell on the same knee, and in ten minutes it began to swell and became painful. He went to bed, but later returned to work; he remained lame.

Local examination.—The left knee was smaller than the right; no area of tenderness; no swelling; no fluctuation; no shortening of leg; no history of locking.

Operation was undertaken, as already described. The joint was exposed; an excess of infrapatellar fat was removed. The anterior part of the external semilunar cartilage was loose, so the cartilage was removed. Closure was carried out by the usual method. The patient returned to work cured.

CASE 2

H.T. In July, 1932, this patient tripped and fell, striking his left knee, and was unable for one hour to straighten it out. His physician strapped his knee, with

no improvement; pain was felt below patella. Unable to keep the left leg straight; pain in joint when leg was extended; pain in thigh when leg was flexed at the knee.

Local examination.—The leg was held in flexion and external rotation; pain and tenderness over the adductors. At operation by the usual method both sides of the patellar capsule were thickened and congested; the anterior portion of the internal semilunar cartilage was fractured and loose. The whole cartilage was removed. The external cartilage was much eroded and was loose; it was removed.

CASE 3

J.B. had pain in the left knee, extending into the hip, caused by the foot rolling on a round stone and the leg bending laterally. He worked for half a day; then had the usual treatment, rest and splinting.

Local examination.—Negative, except for tenderness over the medial side of knee.

The usual operation was done. The capsule was opened. Excessive reduplication of the capsule and infrapatellar fat was found. The pad of fat was removed and the excessive reduplication of the capsule corrected. This extended at least one inch into the joint. A free body was exposed, and another incision was made on the other side of the patella; after the capsule was incised a free body the size of a hazel nut was removed, and the internal semilunar cartilage, which was fractured, was also removed.

CASE 4

H.N. had had a previous operation and the internal semilunar cartilage removed, but pain continued on the outer side. The usual incision was made, the capsule opened, and the external cartilage removed, which allowed full extension of knee. The patient made a fair recovery for the knee.

CASE 5

J.L. had been hit on the outer side of the left knee by a skidding log. He was unable to work, as the knee felt as if it was out of joint.

Local examination.—Tenderness over the internal surface of the knee; pain in all movements; some grating; about twenty degrees of limitation of flexion.

The usual operation was done. The capsule was incised. A foreign body, the size of a grape, was found loose. It was connected by a pedicle attached to the inner side of the capsule and was of a cartilaginous nature; it was removed.

CASE 6

G.P. had been struck on the inner side of the right knee, and had severe pain for the following two months. His only complaint was pain.

Local examination.—Flexion limited on account of pain; extension normal; pain in adduction and on rotating the knee; tenderness limited to the inner side of the knee.

The usual operation was done. On opening the capsule the internal cartilage was found loose and was removed; the infrapatellar fat pad was found to be pushing the capsule into the joint, and the ligamentum mucosæ was thickened and œdematous. All redundant tissue was removed. This caused severe hæmorrhage when the tourniquet was taken off, so I had to open the other side to tie off a bleeding vessel. This patient, six months afterwards, complained of numbness in the knee joint and over the head of the fibula.

CASE 7

E.S. fell among a pile of steel and twisted his right knee.

Local examination.—Puffiness present over the inner side of the right patella; tenderness over the inner side of the head of tibia; pain on motion.

On opening the capsule a band of synovial membrane which had been cut off laterally and which had healed over, attached at both ends and floating free within the joint, in size two and a half inches by half an inch, was removed.

This patient complained of pain when walking, after three months. In checking up afterwards, I am of the opinion that his statement as to pain was exaggerated.

CASE 8

H.T. slipped in a hole, twisting his left knee. He entered hospital for one month. After a short time he was unable to straighten his leg after flexing it. The knee was never really locked.

Local examination.—Loss of power to flex or extend the leg at the knee; tenderness over the inner surface of knee and tibial tuberosity.

At operation the infrapatellar fat was found to be congested. This was removed and on opening the capsule I found much inflamed tissue along the ligamentum mucosæ and a very thick and inflamed capsule. All inflamed tissue was removed. I also shortened the patellar ligament, as it was relaxed, loose, and weak.

CASE 9

L.B. twisted his left knee while working on a transformer. He complained of pain and weakness in the knee when walking.

Local examination was negative.

On opening the capsule, a large loose tag of cartilage was found, which evidently had been torn off. The usual closure was done, with perfect after-results. All the symptoms, including pain, completely disappeared.

CASE 10

B.L. had his left foot caught between the plank and timber of a boiler and twisted his left knee. He complained of the knee locking frequently, and stated that the condition was getting worse.

Local examination.—Knee swollen; limitation of movement; marked tenderness over the internal portion of the joint.

At operation, on opening the capsule, I found the whole anterior part of the internal cartilage split and loose. There were two parallel fractures. The cartilage was removed.

CASE 11

H.S., injured his knee by falling from a ladder.

Local examination.—The right knee was slightly swollen; pain on walking, and at times knee caught.

On opening the capsule, the cartilage was found intact. The ligamentum mucosæ was torn and loose and twisted on itself. Attached to it was a piece of synovial membrane which was relaxed and extended into the joint. Complete recovery.

CASE 12

J.LeB. complained of pain in the left knee, and locking at the knee. The capsule was opened, and fractured external and internal semilunar cartilages were removed. Cured.

In regard to the above reports I make no comments, except to state the condition on return to work. Numbers 1, 2, 3, 5, 6, 7, 8, 9, 10, 11 and 12 were cured. Number 4 was improved. Number 6 was cured, but complains of pain over the head of the fibula. Number 7 is cured, but complains of pain on walking. The patients have been re-examined by me, three to six months after return to work, and in many cases after one year of labouring work, with result as given. If not operated on the majority would have gone through life with a constant weak, painful joint, losing much time from work.

A COMPARATIVE STUDY OF THE HABITUAL USE OF BARBITURATES AND COAL-TAR DERIVATIVES AS FURNISHED BY REPORTS FROM VARIOUS HOSPITALS THROUGHOUT THE UNITED STATES

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ACETANILID was introduced as a drug in 1886. It was first used to reduce fever, but its anodyne properties were discovered soon afterwards, and it was found to be specially valuable in neuralgia and headaches. The general public quickly recognized its anodyne properties and relative harmlessness, and it soon achieved great popularity. Strangely enough, despite its indubitable therapeutic value, acetanilid has been a subject of controversy for a considerable period of time. Newer drugs, particularly those of the barbituric acid group, have achieved a place in medical esteem, and have displaced acetanilid and a few other coal-tar products, or at least have retarded an unbiased and critical examination of the values and demerits of this particular drug. Therefore, it is very difficult to find unprejudiced and scientific evaluation of acetanilid and other coal-tar products in recent literature. This fact, coupled with my own experience of the merits of acetanilid preparations in routine practice, led me to undertake a series of studies of acetanilid products extending over several years. If acetanilid, as some claim, is habit-forming, the hospital records should be full of cases of such habits. If such preparations are poisonous, the hospital records should likewise contain numerous reports of poisoning and deaths. As hospital records are more accurately kept than the records of private physicians, the former would be the natural source of unbiased information regarding these drugs. Therefore, I prepared a questionnaire dealing with a comparative study of hospital cases involving the alleged habitual use of coal-tar derivatives and barbiturates, and 8,500 of these questionnaires were sent out. Every hospital in the United States received one: 2,046 replies were received, distributed as shown here.

Alabama 19; Arizona 22; Arkansas 20; California 117; Colorado 37; Connecticut 40; Delaware 7; District of Columbia 14; Florida 22; Georgia 36; Idaho 15; Illinois 127; Indiana 47; Iowa 58; Kansas 44; Kentucky 47; Louisiana 7; Maine 20; Maryland 32; Massachusetts 88; Michigan 89; Minnesota 75; Mississippi 29; Missouri 44; Montana 15; Nebraska 30; Nevada 3; New Hampshire 18; New Jersey 79; New Mexico 12; New York 144; North Carolina 38; North Dakota 20; Ohio 87; Oklahoma 30; Oregon 21; Pennsylvania 111; Rhode Island 8; South Carolina 16; South Dakota 21; Tennessee 17; Texas 52; Utah 14; Vermont 13; Virginia 37; Washington 32; West Virginia 11; Wisconsin 50; Wyoming 8; received later —unclassified 103. Total 2,046.

As far as I know there are only two other sources of authoritative figures available on this subject. One was supplied by a special investigation on drug addiction conducted by the State of Massachusetts. The other consists of the reports of the Medical Examiner of the State of New York for 1930, 1931 and 1932. As for the special survey, it appeared to show that acetanilid is less toxic and leads to fewer cases of addiction, poisoning or death than the other drugs that are discussed in this paper. In considering all the facts adduced, it must be borne in mind that the barbiturates are usually dispensed on prescription, and therefore are not nearly so widely used as the freely available coal-tar products such as acetyl-salicylic acid, acetanilid, etc. Therefore, it is probable that the gross "used figures", *i.e.*, the number of persons using acetanilid or other coal-tar preparations will greatly exceed those using barbiturates. Therefore, also, it is safe to assume, for purpose of general comparison, that the percentages of addiction, poisoning, etc., due to coal-tar preparations would be very much lower than those due to barbiturates, were it possible to gather a complete list of users, or were it permissible to establish a ratio with the amount of these products sold.

Table I is a copy of the questionnaire.

TABLE I

1. Name of Institution.
2. Is your hospital a general or a special hospital?
3. Annual hospital admissions?
4. Do you receive mental cases?
5. Do you receive drug addicts?
6. Have you in the past ten years had any cases of addiction to the following drugs or proprietary preparations containing same:—
   (1) Allonal
   (2) Barbital
   (3) Luminal
   (4) Veronal
   (5) Antipyrine
   (6) Phenacetin
   (7) Acetanilid
   (8) Acetyl-salicylic acid.
7. Have you had in the past ten years any cases of poisoning from:—
   (1) Allonal
   (2) Barbital
   (3) Luminal
   (4) Veronal
   (5) Antipyrine
   (6) Phenacetin
   (7) Acetanilid
   (8) Acetyl-salicylic acid.
8. Were these cases due to overdose or idiosyncrasy of patient?
9. Have you in the past ten years had any *deaths* from:—
   (1) Allonal
   (2) Barbital
   (3) Luminal
   (4) Veronal
   (5) Antipyrine
   (6) Phenacetin
   (7) Acetanilid
   (8) Acetyl-salicylic acid.

If any of the above questions have been answered in the affirmative are your records available?

(Signature).....

Table II gives a general summary of the replies.

TABLE II

1. Name of Institution: 1,749 replies.
3. Annual hospital admissions. Total 2,499,055 per year, not including 331 institutions who did not give admissions. (10 year total, 25,000,000).
4. Do you receive mental cases?
   506 yes. 10 did not answer.
6, 7, and 9.
   Barbital and veronal being chemically identical, the replies to the usages of this drug are totalled together.

	Addiction	*Poisoning*	*Deaths*
(1) Allonal	87	103	10
(2) and (4) Barbital (Veronal)	422	903	90
(3) Luminal	136	179	24
(5) Antipyrine	2	6	2
(6) Phenacetin	2	16	3
(7) Acetanilid	85	117	12
(8) Acetyl-salicylic acid	115	74	4

8. Were these cases due to overdose or idiosyncrasy of the patient?

Overdose	*Idiosyncrasy*	*Did not answer*
217	79	78

Assembling the answers to questions 6, 7, and 9 in the form of a grand total under the heads of barbiturates, coal-tar derivatives, excluding acetyl-salicylic acid, we have, for a ten-year period:—

	Addiction percentage	*Poisoning percentage*	*Deaths per million*
Barbiturates	25.8	46.14	5.00
Coal-tar derivatives (except acetyl-salicylic acid)	3.8	5.56	0.64
Acetyl-salicylic acid	4.6	3.00	0.16

For practical purposes, I have given the number of admissions as 2.5 millions. The total number of admissions of those replying was 2,499,055. However, 3,000,000 would probably be more nearly correct, as 331 hospitals who replied, failed to state the number of annual admissions. The number of cases of addictions, poisoning and deaths is also undoubtedly too small. Most hospitals gave numbers. These replies give an accurate count. Others merely replied "yes" to questions asked. To these, I arbitrarily assigned the figure "one case". This of course, is a minimum, but any decrease in numbers that might be caused by this is compensated for by annual admissions of 331 hospitals who failed to report their total admissions. Thus, while the total poisonings, addictions or deaths may be slightly decreased, the per capita annual admission figure, it is felt, will be actually increased; *i.e.*, the ratio of addictions, etc., to people involved will be actually slightly larger than what I have reported.

A more detailed summary of the answers follows.

Question 4.—Do you receive mental cases?

Five hundred and six answered "yes", and these gave 212 positive reports of addiction, poisoning or deaths from barbiturates or coal-tar derivatives.

The total annual admissions in the hospitals answering "yes" were 829,148.

TABLE III

Total

	Addictions	*Poisonings*	*Deaths*
Barbiturates	645	1,185	124
Coal-tar group (except acetyl-salicylic acid)	94	139	17
Acetyl-salicylic acid	115	74	4

In Hospitals Receiving Mental Cases

	Addictions	*Poisonings*	*Deaths*
Barbiturates	441	688	72
Coal-tar group (except acetyl-salicylic acid)	38	63	8
Acetyl-salicylic acid	78	36	2

Question 5.—Do you receive drug addicts?

Five hundred of the 1,749 institutions replied "yes".

These represent 832,000 annual admissions.

TABLE IV

Total	*Addictions*	*Poisonings*	*Deaths*
Barbiturates	645	1,185	124
Coal-tar group (except acetyl-salicylic acid)	94	139	17
Acetyl-salicylic acid	115	74	4
In Hospitals Receiving Drug Addicts			
	Addictions	*Poisonings*	*Deaths*
Barbiturates	353	718	73
Coal-tar group (except acetyl-salicylic acid)	22	63	7
Acetyl-salicylic acid	81	48	2

Of course, some of the answers to questions 4 and 5 overlap, as some hospitals admit both mental cases and drug addicts.

Question 6.—Have you in the past ten years any cases of addiction from the following drugs or proprietary preparations containing them—allonal, barbital, luminal, veronal, antipyrine, phenacetin, acetanilid and acetyl-salicylic acid?

In interpreting the replies, I am compelled to use the term "addiction" in the broader sense of the word, *i.e.*, "habitual use". One cannot place the narrower interpretation of addiction upon these drugs, such as addiction to morphine, where the system becomes completely dependent upon the drug, a definite craving is established, and severe pains, nausea and collapse or even death result from sudden withdrawal—the whole known as withdrawal symptoms. Some doctors distinguished between addiction and customary use, and the following are some of the comments. "Not addiction but popular use." "No—except popular habit." "We may admit one or two a year addicted to these preparations, but these drug addicts are usually found to be psychotic, with psychopathic personality, psychoneurotics, and, rarely, a dementia præcox or manic depressive." One doctor writes, "In thirty-two years no habit formation has been seen, except one case of allonal addiction in a patient who was using it to get off morphine." Another states: "Am impressed anew with the fact that the drug is not the important factor in these cases. While I am not offering the results of a careful analysis, a brief survey suggests that the question of personality in those who have become addicted to these drugs is of paramount importance. I do not offer this as a new observation, of course, but I am so strongly reminded of this relationship that I feel it worth while to add it to the questionnaire."

Question 7.—Have you had in the past ten years any cases of poisoning from: allonal, barbital, luminal, veronal, antipyrine, phenacetin, acetanilid, and acetyl-salicylic acid?

Again, the term "poisoning" must be considered in its broader sense, as any untoward action, such as a slight skin rash or an asthmatic attack, and not to the extent of collapse and danger of death. Many qualified their replies with some such statements as: "To the extent of skin rash only." "Hives", or "Urticaria", was frequently written. "Mild cyanosis", was written occasionally.

Of the 1,398 cases of poisoning reported over a period of ten years the barbiturates lead by a wide margin, comprising 1,185, or 85 per cent of the total. Poisonings by the coal-tar group, exclusive of acetylin-salicylic acid, comprised 139, or 10 per cent of the total, and poisonings by acetyl-salicylic acid comprised 5 per cent of the total.

Question 8.—Were these due to overdose or idiosyncrasy?

Cushny observes that from widely used drugs abnormal reactions are well known and adds that the abnormal symptoms sometimes produced by the modern antipyretics are well known, but adds that it is not improbable that if other drugs were used to the same extent they would induce untoward reactions in an equally large number of persons. There are, of course, more individuals who take one or more of the coal-tar drugs than who take other drugs. This is not true of the barbiturates. Some people show a toxic response to almost any drug in the pharmacopœia, while others show toxic responses to certain foods. Such reactions may range from a simple skin rash to an alarming state of collapse. The ultimate etiology of idiosyncrasies is still inexplicable in the light of modern science.

Idiosyncrasy is one important consideration. The taking of an overdose is obviously another.

Three hundred and eighty-five hospitals reported poisonings or death over ten years. Two hundred and seventeen of these attributed the cause to overdosage, 79 gave "idiosyncrasy",

and 78 did not answer. Only 6 said "no" to this question.

Question 9.—Have you in the past ten years had any deaths from: allonal, barbital, luminal, veronal, antipyrine, phenacetin, acetanilid, and acetyl-salicylic acid?

The reports were as follows: barbiturates 124; coal-tar group (except acetyl-salicylic acid) 17; acetyl-salicylic acid 4. Of these drugs, veronal leads the list thus far. It was mentioned 32 times in connection with suicides and attempts at suicide.

TABLE V

Addiction	*Figure for ten years*	*Figure per million*
Barbituric acid group.....	645	258.0
Coal-tar group.....	94	38.0
Acetyl-salicylic acid	115	46.0
Poisoning		
Barbituric acid group.....	1,185	461.4
Coal-tar group.....	139	55.6
Acetyl-salicylic acid	74	30.0
Deaths		
Barbituric acid group.....	124	50.0
Coal-tar group.....	16	6.8
Acetyl-salicylic acid	4	1.6

A comparative study of my findings with those of the data secured from the Massachusetts investigation, the report of the Medical Examiner of the City of New York, the report on poisons from the British Empire, and the reports of the American Manufacturers' Association, together with an analysis of reported deaths from acetanilid poisoning, will be published by me in the near future.

CONCLUSIONS

1. The coal-tar derivatives provide an insignificant number of cases of "addiction" or "poisoning", and, admittedly, the cases called "addiction" were not true addiction, and the cases of "poisoning" not true poisoning. They are likewise rarely the cause of death.

2. The coal-tar derivatives do not present serious problems. They are in no sense dangerous drugs.

3. The barbiturates present a distinct problem, entirely different from that of the coal-tar derivatives, and should be classified and studied separately.

4. The untoward action of coal-tar products and barbiturates was due either to overdosage or idiosyncrasy. Overdosage is more than idiosyncrasy, and this especially applies to the barbiturates, which are frequently taken with suicidal intent. In physiological doses neither series is harmful to normal persons.

5. Reviewing the number of deaths, out of 25 million hospital admissions in a period of ten years, I find the following:

Barbiturates—50 deaths per million admissions.

Coal-tar derivatives (not including acetyl-salicylic acid)—

6.8 deaths per million admissions.

Acetanilid—5.7 deaths per million admissions.

Acetyl-salicylic acid—1.6 deaths per million admissions.

None of these drugs is a significant cause of death, as is proved by these statistics. Finally, 10 deaths from opiates and barbital derivatives in the whole state of Massachusetts for 1929, and not a single death from acetanilid or allied coal-tar derivatives speaks well for the latter. When it is remembered that thousands turn to the coal-tar preparations daily for relief from pain, their comparative innocuousness is self-evident. It would be unfair to deprive people of these drugs which are probably of more benefit and add more to comfort and happiness than any group of drugs yet discovered, and yet are, at the same time, relatively free from any ill effects.

The race is not always to the swift. Time and chance wait for all men. The luck that is yours today may be another's tomorrow. The misery that is yours today may be past like a summer shower next month or next year. Not only the fatality of one's temperament, not only the destiny of one's heredity and environment, but pure accident plays an overpowering and dominant part in one's days. One may well be awed and hushed when one thinks what a part, for example, pure chance plays, chance the greatest of all the gods, in those accidental encounters with this personality or with that personality such as absolutely change the whole course and current of one's life. —Powys.

THE TRYPARSAMIDE TREATMENT OF GENERAL PARESIS*

BY J. N. SENN, M.B.,

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BEFORE commencing any treatise on the treatment of paresis by tryparsamide it probably is not out of place to mention briefly the treatment of syphilis of the central nervous system, broadly. It is correct, I believe, for treatment purposes, to divide syphilis of the central nervous system into three broad groups: (1) where the blood vessels are particularly affected; (2) where the chief involvement is of the meninges; (3) where the cortex of the brain is chiefly attacked.

In the first two types novarsan or other arsenicals of similar character would appear to offer as good or better prospect as can be offered with tryparsamide. In the third type, namely, where the cortex is involved chiefly, they undoubtedly cannot compare with tryparsamide in efficacy of treatment. Tryparsamide, by reason of its peculiar molecular construction, undoubtedly enters the spinal fluid in much greater arsenical concentration than do the older arsenicals. This would appear to be as a result of its greater ability to pass through the choroid plexuses. The cells of the cortex which are affected are therefore bathed in a higher arsenical concentration than with any other known method. This viewpoint is stressed by Kirby.[1]

For some years it has been our custom to treat in this manner the different types, recognizing, of course, that probably no one type is clearly separated from the others, and so we treat with both drugs, the courses varying according to symptomatology. Both drugs are combined with bismuth intramuscularly. Tryparsamide was developed by Jacobs and Heidelberger in 1915, and first supplied by the Rockefeller Institute to clinics for the treatment of paresis in 1923, and, following the report of Lorenz, Loevenhart and others,[2] was offered for general sale in 1925. Since this time its use has been steadily increasing, and now it is a definite therapeutic agent, recognized to be efficacious, and in any other form of treatment of paresis, *e.g.*, with malaria, an adjunct to be combined. Raiziss and Severac[3] and Moetsch, also others, have confirmed the fact that in systemic syphilis of rabbits tryparsamide appears to be of little or no value. These results have been confirmed in the human being by many workers.

Tryparsamide would appear to be of particular benefit in treating paresis of two types, (*a*) the group showing recent onset, and (*b*) the patient who has not responded well to earlier treatment, and in whom probably permanent or partially permanent hospitalization is indicated. In the acute type tryparsamide undoubtedly gives results, and produces remissions, with marked change in the serological findings; in some contrast to the type in which cerebral œdema would appear to be the main etiological factor, and in which, when this is removed, a remission occurs without much change in serology. In the continued treatment cases tryparsamide would appear to offer an excellent method of keeping the patient in good physical condition, so that he may be moderately, at least, economically useful. There is no doubt but that our modern treatment tends to keep the patient out of bed, and thus relieve us of the care of bedridden patients in the stages that used to be seen. It is now noted that when a patient has to be put to bed his period of life is short and much more pleasant, from the viewpoint of relatives and hospital, than was formerly the case.

Tryparsamide therapy probably should differ in these two types. In the acute type treatment should be pushed, as is done with other medicine, until either results are obtained or toxic symptoms develop. It has been our custom to treat such patients weekly, commencing with small doses, and increasing, watching the eyes carefully, combining their treatment with bismuth, paying little or no attention to courses, and continuing such until the desired effect is reached or toxic signs develop. The signs of toxicity must be closely watched for, of course. The drug is given intravenously in grm. 2 or grm. 3 doses, well diluted, probably to 20 c.c.

* Read before the Sub-section of Neurology and Psychiatry, Academy of Medicine, Toronto, March 16, 1934.

in freshly distilled water, taking the ordinary precautions for such administration. We have, by following this method, been able to treat intensively, and we believe thoroughly, with a minimum of risk and a maximum of result. We have given several patients approximately 100 doses, some more, before any signs of toxicity developed, and have discontinued on the slightest signs of such. In these cases, after prolonged administration, probably treatment should be eased somewhat and a more conservative course instituted. It would appear in many cases that the "course treatment" is probably not so much for the rest of the patient as for the physician. We believe that steady treatment will tend to keep the arsenical concentration of the spinal fluid at its highest non-toxic level, and so give the patient his best chance for recovery.

After a prolonged continued treatment has been carried out and the patient has a remission, complete or partial, probably the "course treatment" should be advised. Here treatments are given each week for approximately 8 doses, then discontinued for probably 8 weeks, then being repeated fairly steadily. This undoubtedly has the effect of increasing the mental and physical well-being of the patient, keeping the arsenical concentration in the spinal fluid fairly high, and not subjecting the patient to the risks of the more vigorous type of treatment. It would seem logical that in treating an illness such as paresis we should use the same precautions as in treating other illnesses, that is, to get maximum results with a minimum of risk to the patient. We feel that probably tryparsamide does not expose the patient to the high mortality rate, prolonged prostration, with prolonged convalescence, loss of weight and general bodily vigour, and unpleasant days and nights, that the more drastic temperature-producing methods do. From the view of ease of treatment there is, of course, no comparison, and one cannot but wonder how much of the result of these treatments is obtained through the personal element of nursing. We would suggest that before a patient be given the more rigorous treatment and subjected to added risks a thorough trial with tryparsamide be made; then if the patient is not showing the desired reaction it will be time for the drastic and spectacular to be brought into the field. If one can get results from a mild treatment one is not justified in using one that is strong, the risks of which are known to be greater.

TOXIC SYMPTOMS

1. *Eyes.*—If the eyes are examined before treatment is instituted, and regularly during the period of treatment there would appear to be little or no danger of complications in this direction. If eye symptoms do occur, of course, the treatment with tryparsamide should be discontinued, and probably never (?) resumed. It seems probable that if a dose of grm. 2 is given toxic symptoms occur rarely, and one is given ample warning. The first sign noted is increasing pallor of the optic disc, followed by limitation primarily in the lateral visual fields, and, if neglected and the treatment is continued, undoubtedly leading to more drastic effects.

2. *Skin.*—After prolonged treatment an exfoliative arsenical dermatitis may develop. This is generally seen early as a dry scaling of the epithelium, and may lead to a condition of severe gravity to the patient. This would not appear to be so frequent with tryparsamide as with other arsenicals.

3. *Gastrointestinal tract.*—Occasionally vomiting occurs after each treatment, or only infrequently. Probably, if the eyes remain normal and no sign of skin irritation develops one can continue treatment with a lower dosage and not obtain bad results.

4. *Fainting.*—Fainting may occur, but apparently only when treatment has been pushed to the limit, and, following it, if treatment is carried on at a less concentrated level, the patient will react normally. With fainting there usually is cardiac acceleration, which is only temporary and disappears if the patient is rested a short time.

DIFFICULTIES IN TREATMENT

The primary essential in the chemo-therapy of paresis would appear to be a drug with the ability to permeate the choroid plexus and enter the spinal fluid in high concentration, which has a definite action when it reaches its goal, and has minimum toxicity.

Purves-Stewart[4] states that regeneration of destroyed nerve elements within the central nervous system (as contrasted with peripheral

nerves) does not occur. The most we can hope for is to arrest the degeneration at the stage which it has already reached and to make the most of those nerve cells and fibres which survive. Does it not seem logical to compare paresis with other organic brain disease, *e.g.*, senile? In both there is definite destruction of brain tissue. Once this is destroyed we know it does not regenerate, and to hope for this is simply foolish and unscientific. We must be content to stop the disease where it is presented to us, to prevent additional cells being destroyed, and then to adjust the patient to life with what remains for this purpose.

Lorenz,[2] in his report of the treatment of 317 patients in 1923, reported 152, or 48 per cent, recovered at that time. Five years later[5] 88 per cent of those recovered remained permanently restored to mental and physical health; 9, 2 per cent had been readmitted, and 3, 8 per cent had died. This gives a total of 37 per cent remaining well after five years. Of the 42 far-advanced paretic patients treated 21, or 50 per cent, are discharged from hospital and working. These patients had no treatment except tryparsamide, bismuth and mercury. Reese[6] in a group of 341 cases of general paresis reports clinical arrests or remissions in 54 per cent, and in 306 cases of meningo-vascular syphilis clinical or serological cures in 78 per cent. Stevenson[7] quotes 40 per cent remissions in unselected cases of paresis.

We feel that to set a remission rate for those patients coming under our care would not be accurate and would probably be misleading. It is not common for patients to be admitted without previous treatment, and at present malaria frequently has been given in general hospitals prior to admission to our hospital. Almost all patients have had varying types of arsenical treatment and only come to hospital as a last resort, after the facilities for treatment at other places have been exhausted.

In continued treatment cases results can undoubtedly be seen. We do not see the bedridden paretics that used to haunt hospitals. Nowadays very few are in bed, and they only take to their beds a short time before permanent dissolution occurs. Bedsores are a rarity; they should not be found in this type of patient any more than in others. Incontinence of bowel and bladder is rare; paralyses are almost unknown, unless from earlier causes. It is important to note the almost total absence of convulsive disorders even in late stage paretics, a phenomenon so frequently seen previously. In place of paretics being, as they were previously, bedridden, miserable, bed-sore, incontinent, convulsive, they now are the best preserved men of the hospital, alert, clean, industrious, happy, and with an excellent chance of returning to their homes.

SEROLOGY

It is not infrequent with tryparsamide therapy to have the serological reactions become essentially negative. The Wassermann and Kahn reactions of blood and spinal fluid, the globulin and the colloidal gold reactions, all improve materially, the curve flattening out, and many cases not showing any precipitation in the tubes. In continued treatment cases this change should be permanent and steadily improving.

Reese[6] reports his serological changes as follows:—

> Blood Wassermann test, 49.2 per cent negative; 35.6 per cent reduced; 15.2 per cent unchanged.
> Spinal fluid Wassermann test, 25.7 per cent negative; 47.0 per cent reduced; 27.3 per cent unchanged.

While, as mentioned above, we cannot claim that our group shows pure tryparsamide results, we, nevertheless, feel that our findings are worth more than passing thought. We are presenting the results shown in 36 cases of paresis, where treatments have ranged from 129 to 7,—58 per cent of the group having received over 50 and several of the remainder not receiving so many owing to the recentness of their admissions.

The following Table shows the changes occurring in blood and spinal fluid Wassermann reactions, globulin and colloidal gold:—

	Blood	*Spinal*	*Globulin*	*Colloidal gold*
Negative reactions	44.4	25.0	25.0	33.3
Diminished reactions	11.1	50.0	52.8	25.0
Unchanged reactions	41.7	22.2	16.6	27.1
Increased reactions	2.8	2.8	5.6	5.6

The interesting and instructive parts of this would appear to be the high percentage of negative reactions in the blood and spinal

fluids, particularly as one-third of the group show negative colloidal gold precipitation reactions. The number of spinal fluid Wassermann reactions showing fixation of the Wassermann reaction may be noteworthy. The very small numbers of persons showing serological evidence of advance of the disease in spite of treatment is striking.

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CONTUSIONS OF THE EYE-BALL*

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CONTUSIONS of the eye-ball may be divided into two groups—those with and those without rupture of the capsule of the globe.

CONTUSIONS WITH RUPTURE OF THE CAPSULE OF THE GLOBE

This rupture of the eye-ball may be direct or indirect, according to whether the rupture takes place at the point where the contusion is received; direct lacerations are more often in the cornea than the sclera. Indirect rupture of the eye, which is much more common, occurs at points at some distance from the place struck by the object that produced the injury, as, rupture of the sclera with hæmophthalmos and luxation of the lens beneath the conjunctiva. There seems to be a predilection for the corneal margin; the point of least resistance seems to be the sclerocorneal margin, for anatomical reasons --according to Mueller, in the region of Schlemm's canal. If farther back it selects the line along which the anterior ciliary vessels perforate the sclera. Sometimes small ruptures are met with which are situated above and internally to the margin of the cornea. The laceration then takes place through the coats of the eye at the limbus.

Ruptures of the sclera.—Why these lacerations occur where they do makes it necessary to digress a little into elementary anatomy.

The eye may be thought to be a simple, elastic, nearly spherical globe filled with fluid, yet this is not the case, as it is not uniformly elastic; the cornea has a shorter diameter than the sclera, and has a flat surface at the limbus; the coats of the eye have little expansibility; and the contents are not uniformly fluid, since in front is the aqueous humour, and behind, the jelly-like vitreous. The interior also, is not a single cavity, for the lens separates the anterior fluid contents from the vitreous, and, the iris is stretched between the anterior and posterior chambers, leaving the pupil as the only communication between them.

When the eye receives a blow the place struck is pressed in and bruised. The globe of the eye is either stretched at the equator about the line of impact, or immediately opposite the point of impact (contrecoup), or may even be torn on these inner surfaces. In this way the changes at the place where the blow was received may be slight, and a part of the eye far removed from the place of contact may indirectly suffer the injury.

A blow on the eye should never be treated lightly. It should always call for a study of the fundus, especially the region of the macula. A contused eye, like a contused brain, of which it may be considered in some respects an offshoot, is liable to remote hæmorrhage, œdema, commotio of the lens and retina, or cystic degeneration of the macula. The important fact is that in a case of indirect rupture of the sclera with preservation of the conjunctiva there is no danger of sympathetic inflammation in the other eye.

CONTUSIONS OF THE EYE WITHOUT RUPTURE

This is the class which prompted me particularly to present this paper, owing to the many

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medico-legal problems with which we are called upon to deal.

The mechanical changes of compression, displacement of the tissue elements against each other, separation, laceration, and displacement of the entire parts with relation to each other, and combinations of these mechanical effects, depend upon (1) the nature, form, and size of the object that produced the injury; (2) the force and velocity with which the eye is struck; (3) the direction from which the blow comes; and (4) the situation of the point where it is received.

Sir William Lister,[1] in discussing changes met with in military practice, shows that rupture caused by a slowly-moving object which strikes the eye directly, such as dirt or a stone, as in those cases met with in civil life, occurs in the equator, about the line of impact, at a point where the globe is least supported. Whereas, it is found that ruptures caused by rapidly-moving missiles which pass through the orbit but do not strike the eye directly occur at the opposite side of the point of impact; and missiles passing through the back of the orbit cause the cornea to burst forward; or, passing the side of the orbit, may be found near the equator on the opposite side, just as severe blows on the skull sometimes cause bruising of the brain on the opposite pole.

If you can satisfy yourself that there is no rupture of the capsule of the eye, your prognosis is much more favourable, both as to saving the eye and to the preservation of the form of the eye-ball. But, there are many important pathological changes that occur in contusion without rupture, some of which are: hæmorrhage into the eyelids, and beneath the conjunctivæ; cloudiness and erosions of the epithelium of the cornea; iridodialysis, cyclodialysis, or radiating lacerations of the iris; paralysis of the pupil; paralysis and spasm of accommodation; cataract or subluxation of the lens from a compression blow; hæmorrhage into the vitreous humour; commotio retinæ and hæmorrhage; changes in the macula; detachment of the retina; rupture of the choroid, or hæmorrhage, with patches of pigmentation; injury to the optic nerve, or evulsion of nerve head (Lister).

A patient presents himself with a marked swelling and discoloration of the lid. We cautiously lift the upper lid to see if the eye-ball is intact. There is probably extensive subconjunctival hæmorrhage from rupture of the episcleral vessels, the blood from which has traveled beneath the conjunctiva. The cornea may also show slight erosions of the epithelium posteriorly. There may be hæmorrhage in the anterior chamber, usually from laceration of the vessels of the iris or of Schlemm's canal. It is well to test the vision and examine with the ophthalmoscope, in order to insure against missing changes in the posterior chamber also.

Another patient may have an irregular shape of the pupil, with, perhaps, the lower margin straight, and, looking at the ciliary margin of the iris below, it will be seen that the iris has been torn from its attachment and that an iridodialysis is present. This peculiar accident has been explained by the fact that a blunt object, striking the cornea, flattens the latter, and this flattening causes a change in the shape of the eye, dilating the corneo-scleral ring, and the iris gives away. The iris sometimes becomes reattached, but unless the opening is a large one monocular diplopia does not result.

Sometimes we have traumatic mydriasis in contusion, where lacerations have taken place in the sphincter pupillæ, usually a degree of dilation persists which somewhat affects the vision. Again, there may be a traumatic miosis which dilates very badly under the influence of atropine, due to spasm of the sphincter, but this disappears in a few days. Then, again, we have the bending back of the iris on the ciliary body, where it becomes attached by exudate, giving the impression of an iridectomy. This condition, however, happens more frequently in connection with ruptures of the sclera.

Hæmorrhage into the anterior chamber may come from rupture of Schlemm's canal or iris vessels. In other cases a gelatinous exudate appears in the anterior chamber, rendering it opaque. This apparently comes from the paralyzed vessels of the iris and ciliary body. When we find a trembling portion of the iris we may be sure that we have a partial dislocation of the lens.

CHANGES THAT MAY APPEAR IN THE POSTERIOR SEGMENT OF THE EYE-BALL WITHOUT RUPTURE

CASE 1

I had a boy of 19 years last winter who had a contusion from having been struck in the eye with a

hockey puck. The lid was torn, ecchymosed, and there was a very marked hæmorrhage into the vitreous which precluded any examination of the fundus for ten days. I satisfied myself that there was no rupture of the sclera, and there was no change in the anterior segment of the globe, other than dilation of the pupil. He only had light perception and projection, so I concluded that there was trouble in the posterior segment, and when the blood, which must have come from the choroid or retina had been absorbed, a subsequent examination revealed extensive rents in and about the macula and a retinitis proliferans. Vision did not improve beyond 6/20 in this eye, and although I was able to assure him that there would not be any danger of losing his eye or of sympathetic irritation in the other eye, I told him that we need not expect any further improvement in vision.

Hæmorrhages may be present in the retina or choroid, even when there is no hæmorrhage into the vitreous humour, and retinal hæmorrhages are occasionally observed after grave injury to the head, which are caused by intracranial disturbances of the circulation and appear usually as a large, round, dark red disc. If they appear in the region of the macula, the vision is very much disturbed, and decolorized spots, patches of pigment, and connective-tissue bands may remain permanent in the innermost layers, producing the picture of retinitis proliferans, as in the above case.

We see cases without retinal hæmorrhages, but a large part of the retina appears opaque, and a greyish white opacity extends far towards the periphery. The retinal vessels appear distinctly and have no tortuosity, differentiating the condition from detachment of the retina, and no undulations of the membrane are to be seen. This is a case of "Berlin's opacity" or commotio retinæ. A severe contusion, as from a snow ball or large piece of iron, may result in this only, but there may be a few small hæmorrhages in the opaque area. These abnormal appearances all disappear in a few days, from the macula region first, and soon after from other parts of the retina. This traumatic opacity is readily distinguished from separation of the retina, as the course of the vessels in commotio retinæ is not affected. There is no parallactic dislocation or high degree of hypermetropia, and the retinal folds are absent.

Haab[2] has pointed out the interesting fact that in these cases, at the centre of the fovea an isolated, more or less well marked, pale spot is sometimes found, distinctly separated from the remainder of the macular opacity. This is probably not caused by opacity of the retina, because the membrane is exceedingly thin at this point; it is probable that its substratum is situated behind the floor of the central fovea, perhaps in the pigmentary epithelium, perhaps between the latter and the layer of rods and cones. The phenomenon is also transitory. The retina, like colloidal brain, imbibes fluid on concussion.

In rare cases only a discoloration and pigmentation are left. The etiology of this contusion opacity is œdema of the retina, from transudation out of paralyzed choroidal vessels. The fluid enters the retina. The retina and choroid suffer laceration and displacement by the stretching of the capsule of the eye-ball, and by the œdematous saturation. The macula lutea alone is very often injured in contusions.

That the macula is the area most likely to be affected in any contusion of the eye-ball is easily understood when one considers the complex anatomy of the region. According to Dr. Salzmann[3] the edges of the macula really form a low wall, made up of the ganglion-cell layer of the retina, which is raised above the level of the surrounding retina. The edges, therefore, represent the thickest part of the retina, being from 0.275 to 1.41 mm. thick, and the bottom being entirely absent here. The retina varies in thickness from 0.075 to 0.12 mm. The entire funnel-shaped depression of the fovea is formed at the expense of the retinal tissue. This cup is likewise devoid of retinal vessels, and the nerve elements are almost entirely those of the first neuron. Hence the poor protection against assault.

Pigmentation, yellow spots, and even a total atrophy may result from a contusion opacity in the region of the macula, and people are sometimes mistaken for malingerers, if such a condition is overlooked. Connective tissue and pigmentation may develop from hæmorrhage about the macula. We have the peculiar holes in the macula described by Haab as being round, red discs about half the size of the papilla, where the choroid lies uncovered or with only slight traces of retina. It is characteristic of these holes in the macula that pigmented epithelium and decolorization are absent. The area between papilla and macula may become pale as a result of the destruction of the papillo-macular nerve fibres.

Ordinary factors ascribed to the causation of the traumatic hole in the macula are contusion of the eye-ball, or penetration of the globe by a foreign body.

Macula holes, according to Coats,[4] are the result of œdema of the retina at the posterior pole of the eye-ball. The œdema is the result of a temporary ischæmia of the choroid caused by a subchoroidal hæmorrhage. Collins[5] expressed the belief that a hole in the macula can be explained by a subchoroidal hæmorrhage which by its pressure causes ischæmia of the capillary plexus in the choroid. The retina at the macula, being almost entirely dependent for its nutrition on this underlying choriocapillaris, suffers from the cessation of circulation, and a hole results. In absence of trauma, iridocyclitis, toxins in the vitreous or retinal vascular disease produce the same effect.

Detachment of the retina.—The retina is torn occasionally as the result of contusion, and the ruptured part may turn over and roll in; the result is extensive detachment or connective-tissue cicatrization. We are often called upon to decide whether a retinal detachment can be ascribed to an accident, and we must first differentiate whether the detachment is primary or secondary. A primary detachment of the retina may be produced after a hæmorrhage of the choroid, or from serous transudate from the paralyzed vessels of the choroid. A detachment appearing a considerable period after a slight contusion and hæmorrhage into the vitreous humour must be considered as secondary, but when several years has elapsed since the healing of a contusion the detachment that appears is a medico-legal problem. The optic nerve may be involved in serious contusion, and may become atrophic, associated with destruction of the macula and rupture of the choroid.

Rupture of the choroid.—With the ophthalmoscope a yellowish streak may be seen running concentrically to the papilla on its temporal side. Retinal vessels pass over it. These ruptures are either directly formed at the place of impact, or indirectly at some distance from it, the latter being the more common. When they run concentrically to the papilla they are usually caused by a blow with a broad impact. The colour is usually yellowish white instead of the bluish white of the sclera. This is because the choroid is not torn through its entire thickness; the lamina fusca remains. Pigmentation forms at its margin and the rupture is permanent. When the macula is affected we have a central scotoma, but we may have other contractions of the visual field. Detachment of the retina and retinal pigmentation may follow cicatrization at some distance from the rupture. The question as to how these ruptures take place in the choroid, although situated between two other membranes, is a moot one. But, it is generally considered that the choroid is less elastic than the other membranes.

It is seldom that we find all of these changes in the one case. But, I wish to present a patient who shows many of them, and who also presents a very interesting medico-legal problem.

CASE 2

This was a man 33 years of age, an Italian coal-miner. He dug coal under ground for eight years, during which time he only recalls two eye accidents when he came under medical treatment, one, in 1925 at Brule, and, again, at Cadomin in 1929. The accident in 1925 referred to was the result of falling rock or coal striking the right eye. "The doctor's report was to the effect that the eye was painful, with the sclera badly inflamed." He removed a small piece of stone or rock from the eye, and kept it covered for several days. This eye appeared to get better, and the man was unaware that there was anything wrong with it until some time later, when some of the other men remarked on its peculiar appearance. His vision became poor in this eye, and the lens became cataracteous. On or about December 23, 1929, this man was again struck in the right eye with a piece of coal or bone, and with small particles of coal in the left eye. He was off work for seven or eight weeks following this accident, owing to an iridocyclitis and scleritis developing in the right eye, according to the report to the Compensation Board, but no reference was then made to the left eye, other than about the piece of coal which was removed. He returned to work in February, 1930, but noticed when he attempted to read that both eyes watered freely, and he described a burning and stinging sensation in both eyes.

In March, 1930, he saw the doctor in reference to the watering of the eyes, and thought he could not see as clearly with the left eye as he could previous to the accident. In December, 1930, he was laid off work for two weeks with a sprained ankle, and in August, 1931, with a severely strained shoulder. In December, 1931, his left knee was severely injured by a large rolling lump of coal, and he was on compensation for one month. In May, 1932, he was having such difficulty with his vision, that he became discouraged and gave up mining. In the spring of 1933 his left eye was so bad that he was unable to read at all, and he was experiencing great difficulty in carrying out his work. In August, 1933, he saw the doctor, had two weeks' observation and refraction under a mydriatic without results. A blood test taken at that time was negative.

In October, 1933, this man was referred to me because of failing vision in his left eye. The right eye had an extreme external squint, with a remnant of cataract, partially dislocated, and trembling of the iris above. He had perception of light, but very poor projection. Owing to the cataract it was impossible to examine the fundus at this time. The left eye was normal in appearance, the pupil active to light and accommodation, the media were clear, the optic nerve was normal. There was some stretching of the sclera at the periphery of the disc. The macula showed a fairly round hole, half the size of the papilla, discrete and atrophic, dark gray in the periphery, followed by a white area, and then a dark centre, with slight extravasation, and a bleached area around it. There was a long per-

pendicular, fork-shaped area of ruptured choroid considerably below the macula, showing the retinal vessels passing over it, but with no patches of choroido-retinitis or pigmentation, other than the fork-shaped area beneath the macula above referred to. But, there were numerous white streaks running concentrically on the temporal side, both above and below the macula. His vision was 6/60, and he had a central scotoma.

On October 30, 1933, after first having a complete check-up on his physical condition, including the spinal fluid and blood Wassermann test, which were negative, I removed the cataract from the right eye, to see if the fundus of this eye was the same or not. Ten days after the operation his eye became painful and the vitreous turbid, with some floating opacities which eventually were absorbed. The eye then became quiescent.

Ophthalmoscopic examination now shows the other media clear, but the fundus shows atrophy of the nerve head and considerable pallor to the macular side of the disc. There are also white streaking in the same area and a marked rupture of the choroid over the macula, extending and broadening into a large area, with some organized bands in the vitreous below.

Nothing but extensive trauma could account for the picture presented in this eye, but there was some difference of opinion as to whether the changes in the left eye are constitutional or also the result of trauma, or are degenerative from the affection of the right eye. I think there is no doubt but that this man sustained a partial dislocation of the lens of the right eye at the time of the accident, referred to in 1925. This would account for the gradual loss of vision, and the slow progress of the cataract. The white spot was not perceptible to the man until a year later. He no doubt had an iridocyclitis in the right eye in 1929, but there is no evidence of it having been in the left eye or of any retinal vascular disease.

In view of the fact that the man is in good physical condition, that there are no discernible foci, an absence of hypertension or signs of arteriosclerosis or of generalized vascular degeneration to account for a non-traumatic hole in the macula, and, in consideration of his being a healthy young man, engaged in a hazardous occupation, with many mishaps, can the condition in this left eye be other than traumatic in origin? But when did it happen?

CASE 3

This was a robust young man, 22 years of age. He was "cant-hooking" on a portable sawmill, when a flying splinter hit him in the eye, tearing the cornea and conjunctiva. A piece of wood was removed from Tenon's capsule.

Examination of the right eye showed a dilated pupil, an irregular line, with scarring of the cornea, towards the temporal margin of the pupil. The fundus showed the media clear, the optic nerve normal in appearance, a rupture of the choroid running concentrically to the papilla, close to the margin of the disc on the temporal side, and, further out, through the macular area, running in two directions, upward from the macula and slightly downward. In some places the colouring is yellowish white, instead of the bluish white of the sclera. Vision is gone for all practical purposes, but he has a good eye for appearance, and not altered, barring the dilatation of the pupil.

The retinal vessels over these retinal areas show that the rupture of the choroid and retina-sclera are due to the inelasticity of the former. These ruptures are directly formed at the place of impact, rather than indirectly, where they are more common.

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ALLERGIC RESPONSE TO DUST OF INSECT ORIGIN.—H. Randolph deals with a source of atopen in the group of insect emanations not demonstrated heretofore. The allergic response was observed in persons working on the control of the New Mexico range moth caterpillar and was acquired after contact with the eggs and parasite flies. He reports a case of bronchial asthma that was caused by daily contact with these products in the work of controlling the New Mexico range moth caterpillar. The patient had been working on the problem since 1930. The chief complaints were sneezing and coryza, nocturnal dyspnœa and wheezing. The patient was exposed to inhalation of the fine dust from dried specimens of eggs in the various stages of parasitization and emergence and to the dust of the empty shells of eggs from which a few of the range moth larvæ emerged. He inhaled much dust from the floor of the incubation cages. The common pollens of the vicinity by both scratch and intradermal methods were found to be negative. Dust specimens were collected from the patient's laboratory, and Coca's solution extracts were prepared from material obtained from dust from the floor of the laboratory, old dry wings of the moth and so on. In order to determine more conclusively the source of the atopen, skin tests were made with Coca's solution extract of larvæ hatched in a cotton stoppered test tube and the empty egg shells after emergence of the larvæ. These produced the strongest skin reactions. Intracutaneous injections of 0.03 c.c. of a 1 to 500 by weight solution extract of combined larvæ and egg shell dust with an equal dose of the combined May fly atopen, furnished by Parlato, was given three times a week for two weeks, the dose being increased gradually. After the third injection the patient had a reaction within an hour after the treatment and wheezing and coughing, and there was a more marked local reaction than usual. After two weeks the patient received 0.15 c.c. of the extract about once a week. Each intradermal injection resulted in an urticarial welt about 3 cm. in diameter and in swelling of the arm from 3 to 4 inches along the arm, and the thickening remained for a day or two. Within two weeks after these injections were begun the nocturnal wheezing and coughing ceased. There was very definite improvement in the rhinitis, although not complete relief. The patient has continued at the same work and has been practically free from symptoms. Of 30 hay fever patients tested to the extract, 2 were found to show a two-plus reaction, the others a negative reaction.—*J. Am. M. Ass.*, 1934, **103**: 560.

PERIODIC HEALTH EXAMINATION AND THE GENERAL PRACTITIONER*

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IT is just seventy-three years since Horace Dobell, an English physician, published a book entitled "Germs and Vestiges of Disease", a book which pointed out the advantages of a regular routine physical examination. Since that time medicine in all its branches has made phenomenal progress. One of the most interesting developments has been in the advancement of the prevention of disease. Today we can say that the basic requirements of good preventive medicine may be roughly grouped under two heads: (1) those services which are mainly concerned with "The Public Health", that is the health of the community as a whole, especially as it depends upon the provision of a healthy environment; (2) those services which are necessary to the health of individuals, and which must be individually rendered. These individual services are mainly two: (1) immunization; (2) physical examination at periodic intervals, and health advice.

It is the latter, the periodic health examination, about which I wish to speak. Though advised by many since the time of Dobell, credit must be given to insurance and industrial organizations for first giving the idea serious consideration. In the last quarter of a century it has been more and more favoured, until today there is a demand on the part of the public for periodic health examinations. This is evidenced by the activities of our railroads, industrial organizations, and life insurance companies. It is being brought before the public by radio programs, sponsored by women's clubs, etc. Every new phase of medicine is kept in the public eye by press and magazine articles, and the idea of periodic health examinations is prominent in all health conservation programs. The principle of the periodic health examination has been endorsed by the medical profession and its associations all over the world, in particular by the Canadian Medical Association and the Federal Department of Health and Pensions, the American Medical Association, and also by the war and naval departments of Great Britain, the United States of America, and Japan. The Committee on Medical Costs of the United States, in one of its reports, entitled "Fundamentals of Good Medical Care", has this to say regarding the periodic health examination.

> Every person requires a complete health examination at regular intervals. The purpose of the examination is twofold: (1) To discover any defects, abnormalities, or signs of incipient disease. (2) To give each individual instruction in his particular needs.
>
> Health examinations should be conducted by the regular family physician, and it is highly desirable that a continuing relationship between physician and patient be sustained. The details of the health examination will vary with the age, sex, and general condition of the patient, and with the methods of the practitioner. Each examination should, however, be systematic and complete, and the findings must be methodically recorded.

Before discussing the advantages of the periodic health examination, let us consider the objections which have been expressed by those who criticize the idea. The one we hear most often is that the periodic health examination makes neurotics out of otherwise healthy individuals. Now, in my opinion, a genuine neurotic never has to be developed; he was a neurotic before he ever heard of a periodic health examination. My experience has been that a man who leaves my office in a state of anxiety from learning of some minor findings is possessed of a neurotic disposition and was already worrying before the examination. This unfortunate worrying individual, with a wrong attitude towards his own life and life in general, needs the instruction that only a capable physician can give. He is one of a far too large group who require some mental adjustment. Who is better qualified to minister to his sick mind than the family physician who knows something of his physical and mental background?

Dr. Robert Hutchison, of London, gave a public address at the combined meeting of the British Medical and Canadian Medical Associations held in Winnipeg four years ago in which

* A paper read at the Annual Meeting, Canadian Medical Association, Calgary, on June 22, 1934.

he criticized the whole idea of an annual physical examination. In view of the eminent position Dr. Hutchison holds amongst the profession in Great Britain, his remarks were given a great deal of publicity, and, unfortunately, in many cases were taken very much to heart. There have been occasions in the past few years when I have been surprised to learn that the contents of this address have been taken seriously by some members of the profession. Whether or not that was the intention of the speaker, I cannot say. If it was he would be branded as a sceptic as well as a cynic. However, when we are discussing the so-called disadvantages of the periodic health examination, we cannot do better than quote from this article, which has a most complete summary of the possible faults to be found with this type of work. Dr. Hutchison, discussing the effects of such an examination on the individual, says: "Most of the defects that such an examination would reveal they are better to know nothing about". The average general practitioner has not been in practice many years before he has learned the priceless value of tact. Defects that our patients were not aware of are made known to them every day without their developing neuroses. Every intelligent person desires to know if he has any physical defect, and he *should know*. The applicants for a periodic health examination should not be treated in any different manner.

The object of the periodic health examination is, in part, to eliminate worry. If a man has a serious impairment which would ultimately cause him to consult a physician, it is the duty of the examining doctor to present the case as from one intelligent individual to another, to make the patient realize just how important the impairment is, to make him accept and intelligently combat it. Suppose the physician discovers a heart condition, glycosuria, or even that most dreaded of all modern ills— cancer, I contend that the normal person can be taught to face the situation, just as he has schooled himself to face other crises in his life, to learn to look after himself, so as to delay the inevitable end and to go on enjoying his life, his family and his friends. I am referring, of course, to an individual with a healthy mental state. We go too far if we say that we can eliminate all worry, but at least we can do our part to make it intelligent worry and not introspection. In the natural course of events man is born, lives and dies. There is nothing he can do to prevent either the first or last of these, but his life in between is something which lies more or less in his own hands. He should be taught how best to look after it.

In the first 5,000 examinations done by the Canadian Medical Institute, most of which were first examinations, it is interesting to examine the information received with reference to worry. I might say that the policyholder fills out one-half of the examination blank and the second question he is asked reads thus: "Have you any worry or anxiety about your health? If so, describe. Have you any other worries?" We found about 88 persons per 1,000 were worrying over health matters. Of these, 47 were worrying about a condition which actually existed, the remaining 41 about imaginary ills. Checking over the tenth and eleventh thousand examinations, comprised of many second, third, and even fourth examinations, we find only 40 persons worrying about health matters, and of these 30 had the condition which was causing the worry.

Now, as I said previously, critics of this work claim that periodic health examinations cause worry. Well, we have over three thousand policyholders who have had two or more examinations. We went over their reports to find out how many had been precipitated into a state of anxiety because of having an examination. We found one, and one only, who was worrying over his health because of information furnished by the examining physician. That man learned for the first time that he had diabetes. His examiner found marked glycosuria and a blood sugar of 0.416. He had lost considerable weight, though his only complaint was fatigue. At the second examination he had improved considerably, but had not been following treatment as carefully as he should. He was worried about his health and we undoubtedly caused that worry. In many cases we found the policyholder worrying about health matters at the first examination, and not worrying at the second, even though he had some quite serious impairment which needed treatment. When you consider that over 2,500 physicians have acted as examiners for us, I think you will agree with me that the profession of Canada can conduct periodic health examinations without at the same time developing neurotics. The greatest of all fears is fear of the unknown, and our experience has

been that once the individual knows definitely that he has an impairment he stops worrying and takes the treatment that the examiner or his family physician, if he has one, prescribes. I do not ask you to accept these figures I have given you as conclusive proof that the periodic health examination lessens worry but, from our experience this, we feel, is proved—the periodic health examination does not cause people to become unnecessarily anxious about their health.

Referring again to Dr. Hutchison's address, we find this statement: "Most diseases either cannot be detected early, or, if they are, little can be done to stop them." If that statement be true, then the majority of us are living by false pretences, fooling ourselves, and fooling the public. However, I doubt if the statement were meant to be taken seriously. On the other hand, if the author meant what he said, he shows that he does not comprehend the main idea of periodic health work, namely that we are trying to forestall disease by correcting faulty living habits, elimination of foci of infection, etc. If the finding of actual disease were the primary object the results would be very disappointing.

The speaker, in closing his address, stated that there is only one rule for health and that can be summed up in the one word "moderation". He states, however, that no one is qualified to advise moderation for another. I agree with him that moderation is one of the fundamental rules of health, but very much disagree with the statement that we are not capable of giving advice. If we do not give advice on health matters do you realize who will? We must bear in mind that we, the medical profession, are the custodians of the health of the public. We realize and are fulfilling our responsibilities if we refer to community health, but I doubt if we are fully cognizant of our responsibility to the individual regarding his personal health. The public today are largely receiving their health advice from pseudo-scientific health articles in popular magazines, syndicated articles in the press (some of which, I have been given to understand, are subsidized by commercial organizations), radio broadcasts, and last, but possibly the most influential, advertising. Our friends of the advertising profession are dictating the health rules for the public today. They prescribe *ad lib.* the special vitamins which are needed to cure "that tired feeling". A relief for every ache and pain you have or ever will have stares at you from the advertising pages of the popular magazines. Too many people today are the victims of fads because of the reticence of medical men, and also because of their lack of opportunity to give common-sense opinions. If figures are needed to prove the truth of this condition, I would remind you that it has been estimated that sixty million dollars are spent annually by the Canadian people for medication, and only fifteen million dollars of this is by a doctor's prescription.[1] I venture to make the statement that many families waste more money annually by following "free" health advice than would actually pay the family doctor to give a periodic health examination to the whole family, which would include common-sense advice on health matters. Our position as health advisers to the public is being taken by others whose activities are actuated by entirely financial motives. A periodic physical examination, which would include a frank discussion of the individual's health problems, would go a long way towards checking these pernicious influences that prey upon the public today.

It is in order here to point out some of the physical findings which are found at these examinations, and which can, with proper advice, be partially or wholly corrected. We found during our first examinations that 10 per cent of the examinees were 20 per cent or more over-weight. Of these, 16.1 per cent had a diastolic blood pressure of 94 or over. Among the remaining 90 per cent, only 6 per cent had a similar elevation of diastolic blood pressure. We know that the more an individual is overweight the more is his tendency to an increased blood pressure. In the above was a group 30 per cent or more over-weight; of these 36 per cent had an abnormally high blood pressure. In the first 5,000 examinations, 138 were found with glycosuria, and in only 26 of these was the condition previously known. That is certainly a large number in a group of apparently healthy adults. Twenty-eight decimal nine per cent were advised by their examiners that they were either not taking sufficient exercise or not taking proper exercise. Improper living habits, foci of infection, etc., bulked large in the findings. Enough is known of the results which follow the neglect of such conditions to

warrant us in taking every possible means to try to protect the public from the consequences of such neglect.

The periodic health examination is the only means by which we may hope to discover the cause of the so-called degenerative diseases. At the annual meeting of the Ontario Medical Association, June, 1933, a special committee was appointed to inquire and, if possible, institute research into the causes of these conditions. The committee confined its investigations to diseases of the circulatory system. An exhaustive examination of all available material was made and the possible means of investigating the causes considered. In their report to the Association at the annual meeting, held last May, the following suggestions were made:

1. That the aid of a group of medical practitioners be enlisted in keeping careful records of a large group of younger persons in the province over an extended period, so that ultimately the gaps in our knowledge of the rôles played by heredity and infection in the production of degenerative disease may be closed up, and preventive measures devised for control of the causative factors.
2. That provision be made for the continuous study of such records and the dissemination of the knowledge of any preventive measures indicated by such study.

It was agreed by the members of the committee that if the profession would make an annual physical examination of a large number of young people, and carefully record their findings for from five to ten years, we might get a definite lead as to some of the factors entering into the etiology of these disease processes.

Today the periodic health examination is being advised and rendered particularly to people of middle life, forty years of age and over. Is it not possible that the emphasis should be placed on a much younger age-group? An interesting example of the need for this work among young people is provided by the experience of one of our large financial organizations in the east. An annual physical examination was offered their employees about four years ago. Two hundred and ninety-eight men and women, under thirty years of age, accepted this offer and 769 impairments were found, an average of about 2.57 per each employee examined. The majority of these impairments were of a minor nature, but 41, or 13.7 per cent, of those examined were referred to their family physicians and were placed under treatment by him. At the end of four years, 440, or 57.2 per cent of the 769 impairments recorded in the first examination, were corrected. Though this is a small group from which to draw definite conclusions, I think two facts stand out: (1) 13.7 per cent of supposedly healthy young people had impairments necessitating actual medical treatment; (2) the advice given by the examining physician was accepted and acted upon. This is shown by the fact that over 57 per cent of the impairments were corrected in the space of a few years. In many cases when people reach middle life, evidences of chronic impairments are found, and though considerable can be accomplished in the way of staying disease conditions, could we not prevent these impairments by starting much earlier in life?

Dr. D. A. Stewart expressed some very pertinent remarks in this regard in the Association *Journal* a few years ago. He said: "Our whole plan of dealing with sickness is a poor plan. Modern medical science is wonderful, but the system of applying it to the needs of people is mediæval. Under this system the first diagnostician is always unskilled, and always has a motive for postponing diagnosis, the first diagnostician being the sick man himself. Before he even says 'Good-day' to the man of skill, the physician, the sick man must decide, first, that he is sick and, second, that he is sick beyond the ordinary means of repair, such as rest, which he can himself apply, and so needs skilled diagnosis and treatment. The skilled man comes in only after the unskilled man has made these two decisions, and he almost always makes them late."

The death rate from cancer has doubled in the last thirty years, and each year shows an increase over the previous one. In the absence of any specific cure, surgery, radium and x-ray, separately or in combination, are the best means available. Their success, however, depends upon the early diagnosis of the condition. In a communication from Dr. J. W. S. McCullough, received at my office recently, he made this statement: "Periodical health examinations, if followed by appropriate treatment, would serve to control almost all skin cancer, cancer of lips and mouth, and at least 75 per cent of cancer of the uterine cervix."

Diabetes, in spite of the discovery of insulin, continues to show a yearly increase in mortality. Joslin, of Boston, gives some very interesting figures showing the advantages of early recog-

nition. He cites two groups of cases to prove the value of early diagnosis, those discovered upon application for insurance, and those who applied to him in the rôle of patients. The saving in mortality, through early diagnosis, was greater in younger persons, amounting to 42 per cent at the ages of from fifteen to forty-four. Early diagnosis hastens treatment and retards the development of complications.

At no time have the public been so interested in matters pertaining to health as they are today. The periodic health examination, if practised, will strengthen the proper rôle of the physician as health adviser to the laity. The adult of today is interested, but not to the same degree as the adult of tomorrow will be. The next generation of adults are just now leaving our schools and universities where they have become more or less used to regular physical examinations. The trend of medical practice today is towards a preventive viewpoint, and recognition of that trend, and an adjustment to it by the profession are imperative. It is by meeting the newer conditions and obligations that we will continue to hold the high regard of the public.

The question naturally arises—how are we going to adjust ourselves to this newer viewpoint? How are we going to put the idea of personal preventive medicine across to the individual layman? There is present with many of us the fear of losing prestige with our patients, who might think that our interest in their behalf had an ulterior motive.

Some time ago I sent a questionnaire to ten prominent general practitioners, scattered throughout the Dominion, men whom I knew were conducting many private periodic health examinations every year. One of the questions dealt with this very matter. Not one of the men approached was at all worried by the thought of loss of prestige. The following is a reply to the question given by one of these physicians and is typical of the opinion expressed by all. "I do not think that the general practitioner, or any other type of physician should be afraid of losing caste by suggesting that any of his patients have a periodic health examination. In fact my experience has been that most people appreciate being approached and talked to about periodic health work, and while the percentage taking advantage of the check-up is small, yet, I feel that the propaganda is slowly making headway in the minds of my patients, and the many other individuals with whom I come in contact. As a matter of fact, for many years, I have been talking generally and individually in behalf of periodic health examinations, and I feel quite sure that I have not lost caste in so doing, rather the reverse."

The family physician, if he approaches this subject from the standpoint of prevention of disease, placing emphasis on health as the greatest asset of any individual, could not possibly lower his prestige with his patients. On the contrary, would it not be enhanced? If he keeps the idea of periodic health continually before him when handling his patients he would be surprised by the number of opportunities which would arise for furthering the idea and stimulating interest in the minds of his patients.

Inroads have been made into the field of the general practitioner, and we often hear the remark that the profession is overcrowded. In a recent report, issued by the National Industrial Board of the U.S.A. it was stated that if a program of personal preventive medicine were properly carried out there would not be sufficient medical practitioners to undertake it. If we confine our activities to treatment only we have a very small proportion of the population coming under our observation every year. The percentage of the population requiring medical care every year has been estimated by various means, and the figures range from 5 to 20 per cent. What about the other 80 to 90 per cent? Do they need health advice? Well, they are spending $45,000,000 a year in Canada on prescribed drugs alone, not counting the amount that is spent in different health fads and foibles. The value of personal preventive medicine by means of periodic health work is recognized by the heads of our profession, and there is a growing desire on the part of the public for such service. Today their resources are being wasted by following the advice emanating from commercial sources. The public want advice on health matters, and the family physician is the only member of the community who can intelligently give that advice. Thorough health examination, followed by common-sense information, will benefit the public and maintain the already high position we hold in their estimation.

REFERENCE

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MATERNAL MORTALITY IN ONTARIO*

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THE Provincial Department of Health, believing that the first step towards a solution of the maternal mortality problem lay in securing a complete knowledge and understanding of all the pertinent facts or factors involved, following the study of an adequate number of unselected cases, asked the members of the profession in Ontario to cooperate in a survey of the maternal deaths occurring during 1933. A questionnaire was therefore submitted to the physicians concerned, in order to supplement the information ordinarily contained in the medical certificate of death. Replies were received in fair detail concerning more than 75 per cent of the deaths occurring during the year. Most of the physicians returned the form within a few days of its receipt; a few needed a reminder; some still have it.

It is not our thought that we should draw either conclusions or inferences from the information received; we are merely presenting to you such findings as were obtained from a preliminary study of the questionnaires returned. This paper may, therefore, be regarded in the nature of a progress report.

Scope of the study.—During the year in review some 334 deaths were allocated to maternal causes in their records by the Registrar-General's Department. A total of 309 questionnaires were returned to us by the physicians. In classifying the deaths by cause, when it was clear that a true puerperal cause existed this was preferred to an extra-puerperal cause. On the other hand, when a well-defined extra-puerperal entity was present, and merely the existence of the pregnant state mentioned, the extra-puerperal disease was given the preference. The definition of cause of death as "the disease which initiated the train of events leading to death" in most instances is sufficient to the situation. Otherwise, current vital statistical practice has essentially been followed, except where such procedure militated against medical judgment and common sense.

In statistical offices the general rules of classification are as follows.

If one of the more serious acute infectious diseases, such as typhoid fever, smallpox, diphtheria, or if cancer or syphilis, or if an external cause, such as an accident or homicide, appears on a woman's death certificate with a puerperal cause, her death is assigned to that cause and not to the puerperal cause. (Influenza, however, takes precedence over no puerperal cause except "Other Accidents of Pregnancy", "Following Childbirth (not otherwise defined)", and "Puerperal Diseases of the Breast"). Puerperal septicæmia takes precedence over all puerperal and non-puerperal causes except the ones mentioned. Tuberculosis, in most forms, takes precedence over all puerperal causes except puerperal septicæmia. Other serious chronic diseases, such as cardiac valvular disease and chronic nephritis, take precedence over all puerperal causes except the most severe complications of childbirth. The term "pregnancy" on a death certificate causes a death to be classified as puerperal only when it appears alone, or with a term denoting a mild disorder, or with a cause implying a complication of pregnancy.

On this defined basis, 26 of the cases were ones in which pregnancy was merely an added load to a woman already suffering from tuberculosis, hyperthyroidism, pernicious anæmia, etc. In 26 others some acute infection such as influenza or lobar pneumonia had supervened. These two groups cannot be called true maternal deaths, since death was not specifically due to puerperal causes. The remaining 257 cases

* Read at the Fifty-fourth Annual Meeting of the Ontario Medical Association, Toronto, May 30, 1934.

were considered as puerperal deaths, and studied in detail.

True puerperal deaths. — A discussion of deaths from true puerperal causes will form the major part of this paper.

Distribution of deaths by cause.—In 10 per cent of cases the cause of death was ascribed to abortion; in 15 per cent to hæmorrhage; in 24 per cent to sepsis; in 25 per cent to puerperal toxæmia; in 11 per cent to embolism and sudden death; in 11 per cent to other accidents of labour (ruptured uterus, dystocia, inversion). Ectopic gestation was reported in 4 per cent of those dying.

The outcome of pregnancy.—Of the 257 deaths studied, 133, or 52 per cent, only, were accompanied by a live birth; 56, or 22 per cent, were accompanied by a still-birth, and the remainder, 66, or 26 per cent, were accompanied by no birth. In 20 of these cases, death occurred before the period of viability was reached; in 46 the woman died undelivered of a viable fetus.

Age as a factor.—Three per cent of the cases studied were 15 to 19 years of age; 22 per cent, 20 to 24; 25 per cent, 25 to 29; 20 per cent, 30 to 34; 23 per cent, 35 to 39; and 7 per cent were 40 years and over.

In the age group 20 to 29 years 33 per cent of the deaths were from sepsis. This does not include those dying of septic abortions. Sixty-seven per cent of those dying of sepsis were 29 or younger. The proportion of deaths from hæmorrhage in the age group 30 to 39 was twice that in the age group 20 to 29.

Deaths by place of residence.—For obvious reasons, deaths were classified according to place of residence and not according to place of occurrence. While only 39 per cent of the live births occurred in cities of 10,000 or over, 48 per cent of the deaths took place in municipalities of this class. In rural areas, including communities of less than 1,000 population, 46 per cent of the live births occurred and 42 per cent of the deaths.

Deaths by number of pregnancies.—Over 30 per cent of the deaths from sepsis occurred in primiparæ, and 44 per cent of those dying from toxæmia had no previous experience with maternity. Sixty per cent of those said to have died from other accidents of labour were primiparæ or had had but one previous pregnancy. Thirty-two per cent of all puerperal deaths were in primiparæ.

Death rates by order of birth.—The available data appeared to establish the fact that the first pregnancy provides greater risks than succeeding ones, until the sixth is reached, when the hazard is again increased. It is estimated that 28.5 per cent of all live births are in primiparæ; the death rate accordingly in this group was 4.4 per thousand live births. The rate dropped to 2.5 in those who had had 4 previous pregnancies and rose to 4.5 in those having had 5 previous pregnancies.

Type of delivery.—There were 192 delivered cases. Of all delivered cases, 89, or 46 per cent, were spontaneous deliveries. In puerperal hæmorrhage and puerperal eclampsia the incidence of induced or instrumental delivery was highest, being 62 per cent and 64 per cent of deliveries in the group, respectively. In 12 out of 13 cases of placenta prævia, delivery was non-spontaneous. Delivery was non-spontaneous in 33 per cent of the deaths from puerperal sepsis (delivered cases only).

Details as to the type of interference in 103 non-spontaneous cases were as follows: Induction 6 (6 per cent); forceps 35 (33 per cent); version 23 (23 per cent), Cæsarean section 39 (38 per cent). In 2 cases, forceps were tried first and then a Cæsarean section was performed. There were 2 cases of high and 1 of middle forceps; the last patient died of sepsis and the two others of pulmonary embolism and ruptured uterus respectively.

Delivered cases by type of delivery and place of residence.—It is noteworthy that there was practically no difference between cities and rural areas as to relative proportions of spontaneous and non-spontaneous deliveries, in contrast to the proportion of Cæsarean sections in the two groups. Indeed, were Cæsarean sections deducted from the totals for the cities there would appear to be more interference other than Cæsarean section in rural areas. In towns and villages the cases were few, but there appeared to be an unusual proportion of instrumental and induced deliveries in these places.

Delivered cases by period of gestation.—Of the delivered cases, 24 per cent were delivered at or before the eighth month; 71 per cent reached full term. It would be interesting to compare such facts with what occurs in a large

group of pregnant women with respect to period of gestation in relation to delivery.

Hospitalization.—In a study of this sort it would be of practical interest to know some details of the hospitalization of the cases. How many were hospitalized by previous arrangement? How many were taken to hospital as an emergency measure? We found that 61 per cent of the delivered cases were delivered in hospital and 39 per cent at home. In contrast to this, 73 per cent of the deaths occurred in hospital and 27 per cent at home; that is, 12 per cent of those dying were sent to hospital because of some complication or for being *in extremis.*

Realizing that any compilations made must be regarded with definite reservation in view of the incomplete returns, an attempt was made to secure a comparison of institutional and domiciliary rates for delivered cases. In so doing, a case was called institutional if the woman was confined in hospital and died there, and domiciliary, if she was delivered at home and died either at home or in hospital. The rates so computed were 4.5 per 1,000 live births among institutional cases and 1.9 among domiciliary. For puerperal sepsis alone the rate was 1.4 in institutional cases and 0.6 among domiciliary.

Pre-natal care.—There was no sound basis for a rigid classification of pre-natal care in a given case. The classification used was "adequate", "inadequate", and "none". Cases were judged to have had adequate pre-natal care if the woman had had what seemed to be supervision adequate to her protection. (No arbitrary definition of minimum requirements could be adhered to, since the data provided by the doctors in answer to the query "What pre-natal care, treatment or instructions did the patient have"? were but rarely given in detail). If it was doubtful whether the supervision was adequate, or inadequate, it was called adequate. If, however, there were any gross defect in it, gross oversight as to contracted pelvis, etc., it was called inadequate. "None" meant no supervision whatever. Forty-one per cent were noted as "adequate", 26 per cent as "inadequate", and 33 per cent as "none". The data showed that 44 per cent of the women dying in rural areas had no pre-natal care in contrast to 23 per cent in urban centres. This is to be expected, since it is only in the large centres that any provision is made for pre-natal supervision for those whose financial status precludes them from seeking medical care before labour. Fifty-two per cent of women dying in urban centres received adequate pre-natal care, whereas 30 per cent only of the women dying in rural areas received such care. Possibly the percentage of women surviving pregnancy who received adequate pre-natal care does not differ very much from the above. This is merely a presumption, and does not alter the fact that many of the deaths from puerperal toxæmia (at least) could have been prevented if the women in question had had adequate pre-natal supervision.

Cæsarean section.—The data provided by the questionnaires show that a Cæsarean section was done in 39 of the cases; this is 15 per cent of all cases, or 20 per cent of delivered cases. This would appear to be a high incidence. The operation was performed relatively almost as often in one age group as in another. Albuminuria and eclampsia was given as the indication in 33 per cent of the cases. Twenty-eight per cent of the deliveries among primigravidæ were by Cæsarean section, and among multigravidæ, 16 per cent. Seventy-four per cent of the Cæsarean sections were performed on "urban" dwellers. (Fifty-four per cent of live births and 58 per cent of puerperal deaths were in "urban" dwellers.)

Contributory factors.—As to the state of health prior to the beginning of pregnancy, probably the wording on the questionnaire was such that it did not elicit the information desired; however, in 17 per cent of those answering this question the health of the woman was described as "poor". Of those dying from toxæmia, 20 per cent were said to have been in poor health; this is appreciably higher than for any of the other groups.

Deaths from extra-puerperal causes. — The number of deaths from extra-puerperal causes was, as previously mentioned, 52. Twenty-six of these were found to be suffering before pregnancy from the condition considered as the cause of death; 26 were noted as developing the fatal disease during pregnancy. Cardiac disease and "pernicious" anæmia were the two commonest diseases in the first group; lobar pneumonia and influenza, in the second.

Medical care.—Time does not permit a discussion of the subject of medical care, although much that is of interest was manifest. It is our

hope that this material will be made available to those interested in a later report.

CONCLUSION

In conclusion, we would say that the survey to date has demonstrated that this type of study has merit and should be continued. Only in such a way can insight into this real problem be obtained. It is our hope that the significance of the findings will be appreciated by public health workers and by the medical profession as a whole.

Case Reports

GRAND MAL COMPLICATING THE SECOND STAGE OF LABOUR, WITH SURVIVAL OF BOTH MOTHER AND CHILD

BY ROBERT S. HAYDEN, M.D., C.M.,

Saratoga Springs, N.Y.

The following case appears to represent one of the rarer complications of labour. It is reported with the aim of stimulating interest in this subject, about which the literature is surprisingly scanty.

Mrs. D.C., 23 years old, in her 4th pregnancy, was admitted to the Saratoga Hospital on May 22, 1933, at 5.30 a.m. in the first stage of labour.

The *family* and *personal histories* were negative.

The *physical examination* before delivery was essentially negative. Urine analysis; urine, yellow, cloudy, alkaline, specific gravity 1.015; albumin 0.01 per cent; sugar, negative; acetone, negative; many epithelial cells and occasional pus cell. The fetal heart was 120 in the right flank. Vertex presentation (right occipito-posterior).

Progress.—Labour progressed normally during the first stage. At 12.00 noon the patient was taken to the delivery room. At 12.20 p.m. the head was on the perineum and was about to be born, when the patient suddenly warned us that she was going to have a convulsion. Within one minute, and almost simultaneously with the birth of the head, a severe convulsive seizure began, lasting approximately three minutes, and accompanied by marked cyanosis and tonic and clonic muscular spasms. Chloroform was administered as quickly as possible. Unconsciousness followed. Whether she was able to inhale enough chloroform to produce unconsciousness or whether this was the normal aftermath is debatable. During the seizure all aseptic technique was hopelessly destroyed. With the aid of stirrups and brute force the patient was prevented from injuring the half-born child, whose body was afterwards easily extracted. It was a large baby weighing 9 pounds, 12¾ ounces. The third stage was normal.

The first few days of the puerperium were uneventful. Pheno-barbital, gr. 1 b.i.d., was given. On the 8th day *post partum*, at 4.00 p.m., the nurse noted that the patient seemed very nervous, restless, with glassy eyes and dilated pupils. At 6.15 p.m. she had a convulsion, with glassy, staring eyes, cyanosis, and absence of the radial pulse. At 6.30 p.m. she was sleeping soundly. Twice more within the next 24 hours notations are to be found on the chart regarding a fixed expression with staring eyes, but no further convulsions. On the 10th day *post partum* she left hospital.

On questioning her after delivery the patient first stated that these seizures occurred during labour only, and that they had occurred similarly with her first two babies. She was extremely reticent about the whole matter. No further information was gained until after the seizure on the 8th day *post partum*. Then she gave the following story. Prior to her first pregnancy she had never had a convulsion, and considered her health very good. Toward the end of the 3rd month of her first pregnancy she had her first attack. Since then she had had irregular and infrequent seizures, in some of which she had bitten her tongue. The attacks were preceded by a definite aura of peculiar epigastric distress, and followed oftentimes by unconsciousness. She considered herself very nervous and prone to worry about trivial matters. Anger seemed to dispose to the attacks. During the birth of each child she had had the most severe seizures.

It is now one year since she left the hospital. In reply to a follow-up letter she reports that during the past year there have been two con-

vulsions and numerous occasions when she felt that a seizure might be coming. The children are all living and well.

In considering the differential diagnosis of this complication the obvious conditions to be differentiated are eclampsia and uræmia. Both these may be safely ruled out on clinical findings, plus normal urine and blood pressure results. The blood Wassermann test was negative. Hysteria may also be excluded, I believe, by the presence of cyanosis, of trauma to the tongue, and loss of consciousness. De Lee[1] speaks of a "permanent neurosis" being initiated during pregnancy or labour and persisting. Cobb and Lennox[2] state that any patient who has recurrent seizures is properly called "epileptic". The patient under consideration had not been subjected to numerous clinical examinations, nor, apparently, had she been in contact with an epileptic. It is difficult to believe her capable of giving an hysterical performance which so closely simulated the genuine, unless she had actually witnessed or been impressed by repeated examination with the symptoms and actions of the true epileptic.

In attempting to ascertain the frequency of occurrence of this complication of labour I have been struck by the paucity of information available. Standard text-books barely mention its occurrence.[4, 5] The 1928 Year Book of Obstetrics and Gynæcology[3] quotes Waldstein's article reviewing the literature up to 1928. He reported 23 cases of epilepsy among which there were 54 pregnancies, of which 40 went to term. His own was at that time the only reported case in which the child remained alive. De Lee and Greenhill added two cases in which status epilepticus was fatal to both mother and child. There appears to be confusion between status epilepticus and ordinary epilepsy. It seems improbable that 23 patients having 54 pregnancies all represented status epilepticus. Some, like the present, must have represented ordinary cryptogenetic grand mal.

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Clinical and Laboratory Notes

AN IMPROVED WOUND SUPPORT AND DRESSING

BY O. DEMUTH, M.C., M.D., C.M.,

Vancouver

A symposium on the disruption of abdominal wounds was held by prominent New York surgeons at the meeting of the New York Surgical Society, November 8, 1933, as reported in the *Annals of Surgery,* January, 1934. Many causes were given by the speakers for abdominal wound dehiscence, and suggestions were put forward for its prevention. Among the latter were mentioned: the prevention of the disease itself; the pre-operative preparation of the patient so as to improve his general condition, as by giving plenty of fluids, alkalies, and a high-caloric diet, rich in vitamins; the elimination of all infections where possible, especially those of the respiratory tract; rigid asepsis; suitable anæsthesia and incisions in each case; the detailed technique of wound closure, suture material, drains, etc.; also, the post-operative care, to avoid infection, distention, sneezing, coughing, hiccuping, retching, restlessness.

Most abdominal incisions have come to be standardized as mid-line or mid-rectus incisions. Greater ease in opening and closing, and more room and accessibility to the viscera of the abdomen are afforded. When one recalls that the fascia of the rectus sheath, and especially its posterior layer, is pulled upon transversely by the internal oblique and transversalis muscles in the upper abdomen, it is easy to appreciate that an early giving away or pulling out of the suture material readily allows hernia or dehiscence to take place. The upper abdominal mid-line or mid-rectus incisions are not more prone to hernia than the lower ones. There has been an equal number of lower incisional hernias, notwithstanding that the transversalis and internal oblique muscle fascias join the external oblique fascia to form a fairly strong lower anterior abdominal wall. This is largely due to the fact that many of the operations in the lower abdomen are of necessity done on debilitated and anæmic patients whose tissue healing powers have been lowered. These wounds would more rapidly disintegrate the catgut used in their closure. They are much slower to heal.

To my mind, no adequate solution was offered for the prevention of abdominal wound dehiscence which could be uniformly adopted. In order to overcome this problem, thus preventing the occurrence of hernias in these wounds, I have devised a simple abdominal dressing. It consists of two sheets of adhesive plaster, any depth desired, sewn securely to a strip of elastic material. This in turn is sewn to a separating-type zipper which allows free access to the wound for dressings, etc. There is a piece of celluloid one inch in width the full length of the zipper, which allows direct vision of the wound. The celluloid is pierced by small holes one inch apart, to admit air, to permit the probing of the wound, and to allow the escape of any discharge.

The abdomen is closed in layers in the usual manner with catgut, the skin being closed with a fine silk or dermal suture. The wound is then painted with iodine or mercurochrome, and a strip of gauze may be placed over the wound if the surgeon desires. The central portion of the support may be sterilized by washing it with 1 per cent carbolic or weak lysol solution. With the zipper closed, the support is applied with considerable stretching of the elastic material, by fastening each adhesive plaster tightly round the abdominal wall after removing the crinoline. The adhesive may be punctured in places to admit air, or cut in longitudinal strips for better application.

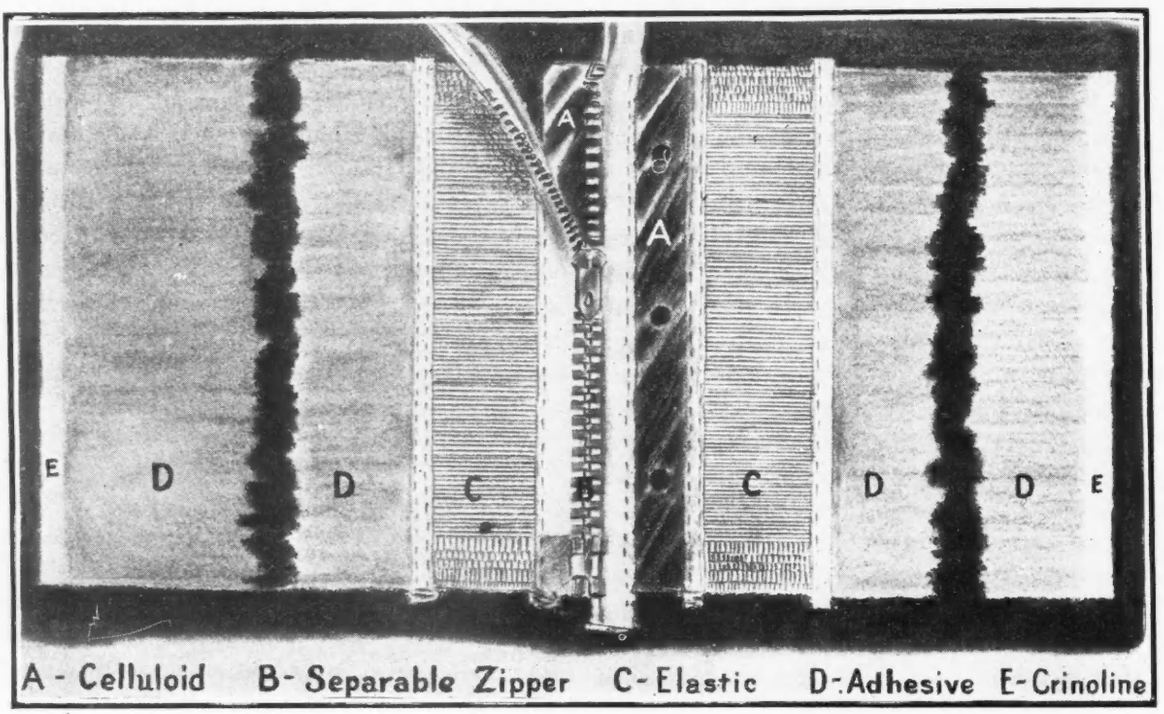

FIG. 1

This simple wound support relieves the strain on the sutures, thereby mitigating wound pain. The relief of the tension of the sutures on the tissues lessens the tendency toward excretion, infection and necrosis. Separation of the edges of the wound, hernia, and dehiscence are prevented by the support. The elastic pull on the deeper structures through the skin, superficial

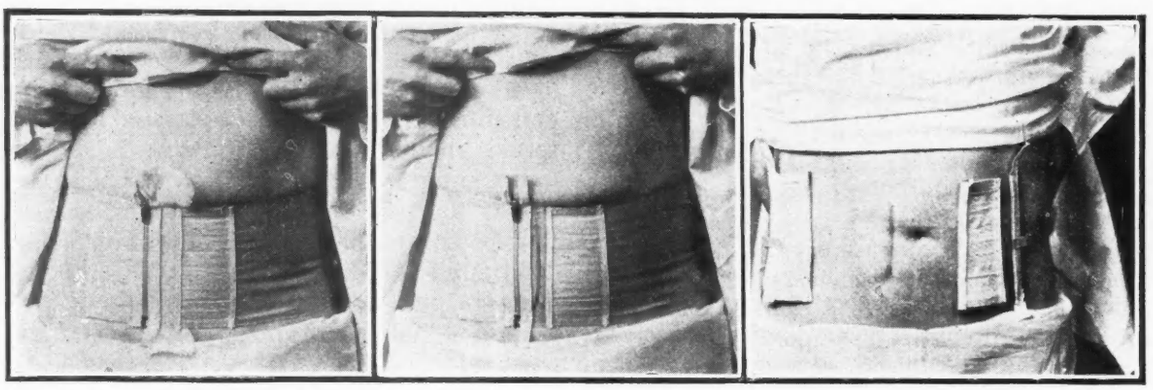

FIG. 2 FIG. 3 FIG. 4

fascia, areolar tissues and deep fascia, to the muscles, their fascia and peritoneum, keeps the edges of the wound in constant apposition. This improves the circulation to the edges of the wound, thereby greatly assisting more rapid and firmer healing. Most of the post-operative wound strain and distress caused by sneezing, hiccuping, vomiting, coughing and gaseous distention can be overcome by applying this simple wound support. Less suture material and especially treated catgut need be used. The sutures should be pulled just tight enough to approximate the tissues they grasp, and act merely as coapting guides. They will, with the more certain and continued support afforded by this new dressing, keep the various layers in contact with each other until strongly united.

This appliance can be made of any size and strength required. It is easily fitted to any abdominal or thoracic wound. It is an ideal dressing for thoracoplasty. A strong piece of elastic, sewn securely to two strips of adhesive plaster, makes an excellent support for fractured ribs. These patients can breathe easily and are more comfortable than with adhesive strapping alone. The elastic is stretched tightly over the fractured ribs, the adhesive being attached to the chest wall on each side. Several narrow supports, with separable zippers and strong elastic pull, can be used to marked advantage in the wounds of compound fractures where skin traction is preferable to skeletal traction. The long strips of adhesive plaster are so placed on the limb to allow easy access to the wound through the zipper openings. Traction is maintained exactly as is done by ordinary adhesive when splints are used.

I have now applied the support in the case of 31 major abdominal operations. The patients were allowed out of bed on the second or third day, and many were able to walk, most of them leaving hospital in half the usual time required. These patients were suffering from the common abdominal complaints which necessitate operation, such as appendicitis of various grades, including two with perforation, cholecystitis, bowel obstruction, gastric and duodenal ulcers, carcinoma and fibroids of uterus, salpingitis, a large ventral hernia, and Cæsarean section. It is most gratifying to see the comfort and confidence these supports give the patients during their convalescence, as compared with other forms of dressings.

These supports are obtainable from the Canadian Surgical Supplies Ltd., of Vancouver, B.C. and Fisher & Burpe Ltd., of Winnipeg and Vancouver.

CULTIVATION OF THE GONOCOCCUS

J. W. McLeod, J. C. Coates, F. C. Happold, D. P. Priestley, and B. Wheatley describe a method for the cultivation of the gonococcus that has proved of great value in routine diagnosis. The medium used is a 10 per cent heated blood agar, prepared from broth made according to Wright's method. The essential feature of Wright's method is the addition of the peptone before the meat is extracted; in this way inhibitory bodies, which are normally formed as a result of the oxidation of the peptone during autoclaving, are reduced by substances in the meat. The percentage of agar in the medium is kept as low as is consistent with stability. The plates are incubated at 36° C. for eighteen hours in a closed jar containing air, 8 per cent of which has been replaced by carbon dioxide. A further incubation for twenty-four hours is carried out under ordinary aerobic conditions. Comparative experiments have shown the beneficial effect of carbon dioxide on the growth of the gonococcus in primary culture. After incubation is complete, a 1 per cent solution of tetramethyl-*p*-phenylenediamine hydrochloride is poured over the plate and run off immediately. The effect of this solution is, by an oxidase reaction, to turn gonococcal colonies a bright purple colour. Medium-sized convex and translucent colonies which rapidly turn a bright purple, and which consist microscopically of Gram-negative diplococci, are accepted as gonococci. For complete identification, when necessary, the colonies can be picked off, and the organisms studied by fermentation reactions and their ability to grow on ordinary nutrient agar. Occasionally, colonies giving the oxidase reaction and consisting of Gram-negative diplococci have been isolated from the genito-urinary tract which subsequent examination has shown were not true gonococci. Organisms of this type are likely to give rise in 1 to 5 per cent of cases to erroneous diagnosis if reliance is placed on the smear method alone. Numerous tabulated results are given to show that the cultural method is considerably more delicate than the direct smear method, but it is pointed out that a certain number of cases do occur in which the smear method is positive when no gonococci can be isolated in culture.—*J. Path. & Bact.*, July, 1934, p. 221. Abs. in *Brit. M. J.*, 1934, **2**: Ep. 56.

Editorial

HISTAMINE IN THE TREATMENT OF ARTHRITIS

HISTAMINE is a substance that for some years past has engaged the attention of the physiologists on account of its remarkable properties and powerful action. Chemically, it is beta-iminazolylethylamine, a substance derived from the hydrolysis of histidin, and, therefore, a degradation product of protein. Barges and Dale, in 1911, discovered that histamine was normally produced in the mucous membrane of the small intestine, and, somewhat later (1924), Lewis and Grant found that histamine, or a histamine-like substance, was produced in the skin when traumatized in various ways which has a pronounced vasodilator effect. Best, Dale, Dudley, and Thorpe (1927) obtained histamine from the liver and in still greater amount from the lung. Histamine has also been found in the spleen (Dale and Dudley) and in the muscles (Thorpe). It would seem therefore, that this substance is rather widely distributed throughout the mammalian body. Histamine was found by Abel to be the poison secreted by the skin of the African toad, and it is interesting to learn, on the authority of Pliny, that toad skin was used in medicine in his day, as, indeed, it was for many centuries afterwards.

In infinitesimal doses histamine produces an evanescent fall in blood pressure (Dale and Richards, 1918), and in large doses, in the animals that are susceptible to its action, the characteristic symptoms of shock. Its chief action is in causing dilatation of the peripheral blood vessels, more especially the capillaries. One is tempted to regard histamine as a hormone, and Burns and Dale accept this view and think that it is liberated chiefly from the lungs. August Krogh, however, regards the evidence for this as inconclusive, and to him it appears more likely that histamine, with other dilator substances, is liberated from various tissues and acts locally on the capillaries in the immediate neighbourhood. As opposing this view of Burns and Dale, Best and McHenry found later that the histamine present in the lung tissue, or any that might be added to it, was speedily destroyed.

The specific action of histamine in dilating the smaller blood vessels, increasing their permeability, and accelerating the circulation, as demonstrated by the physiologists, no doubt suggested the application of histamine, locally, in therapeutics. In 1931 Deutsch[1] reported his results in the treatment of muscular rheumatism with histamine, though J. E. R. McDonagh[2] states that thiol-histamine was introduced as a therapeutic agent long before this (1920). Of course, the local effects produced by histamine can be obtained in large measure by physical measures also, such as massage, diathermy, hot air baths, and the Bier bandage, but it has been found that the action of histamine is more powerful and more lasting, persisting sometimes as long as ten hours after its application.

Histamine can be applied to the desired part topically, the method which Deutsch prefers, or by subcutaneous injection. Ointments containing histamine may be rubbed in, the surplus being removed with ether, or pads soaked in a solution of histamine may be applied and the drug driven in by ionization. According to Deutsch the technique is of great importance. With the subcutaneous method good results have been recorded[3] with 0.5 mg. doses of the hydrochloride. The pain in the joints and muscles directly treated diminished, and also, somewhat unexpectedly, joints at a distance from the site of injection became looser and less painful. According to some observers, histamine is of value only in articular and muscular rheumatism, and has no effect on tuberculous and syphilitic joints, or in gouty and suppurative arthritis. The effects of histamine are not those of protein shock; it does not produce antibodies; and it is analgesic only in so far as it improves the circulation in

1. DEUTSCH, D.: Histamin zur Therapie rheumatischer Erkrankungen, *Med. Klin.*, 1931, **27**: 1491; see also *Deutsche med. Wchnschr.*, 1932, **58**: 827.
2. MCDONAGH, J. E. R.: Letter, *The Lancet*, 1933, **1**: 989.
3. Leading article, *The Lancet*, 1933, **1**: 920.

the affected part. The injection of small doses causes an increase in the alkaline reserve and an elevation of the pH of the blood, with a great increase in the pH of the urine. With large doses the reverse occurs and a state of mild acidosis is induced. Therefore, it is evident that the dosage must be carefully controlled, to produce the proper effect. In inflammatory conditions the pH of the synovial fluid is changed from the normal to a less alkaline condition, and, accordingly small doses of histamine might be expected to counteract this state and help to bring back the pH of the fluid to normal. There are few contra-indications, it is said, but it is wise to avoid the use of histamine in cases of hypotension or cardiac disease.

Bisset[4], of Harrogate, notes that with the use of histamine the body temperature rises one degree Fahrenheit and the skin temperature is raised considerably. The pulse is almost invariably slowed. The blood pressure varies with the dosage. Unlike some others, Bisset finds histamine useful in gout. Marked hyper- and hypo-tension are not contraindications if electrophoresis is employed.

Bisset and Woodmansey[5] point out that in rheumatism the capillaries are anaplastic and attenuated. This suggests the presence of an abnormal vasoconstrictor substance or the lack of a normal vasodilator. There is, in short, a pathological state of imbalance. Hence the rationale of histamine. Bisset and Woodmansey report good results from the use of a salt of histamine, the acid phosphate, in a solution of 1:5000 in distilled water, applied by ionization.

Shanson and Eastwood[6] have tried histamine subcutaneously in seventy adults suffering from chronic rheumatism, rheumatoid arthritis, osteoarthritis, fibrositis, subacute rheumatism and gout. Their initial dose was 0.1 mg., increased by 0.05 mg. daily until definite improvement was observed. The optimum dose in each case must be discovered by trial, and was usually found to lie between 0.1 and 0.5 mg. This dose was repeated two or three times a week, and was farther increased if tolerance became manifest. Relief of pain and increased mobility of the joints was marked, often occurring within a few minutes. These observers found that histamine produced benefit in all types of rheumatism, but cases with periarticular deposits and vasomotor signs were particularly likely to be improved.

The question arises whether histamine as used in rheumatism exerts a systemic as well as a local influence. Shanson and Eastwood (*loc. cit.*) found that histamine caused a slight degree of fullness in the head, with or without dizziness, sometimes headache, drowsiness, occasionally, sweating and paræsthesiæ. A fall in blood pressure usually occurred of from 20 to 40 mm. Hg, but this never persisted more than five minutes. An elevation of body temperature (as taken by the mouth) of 1.5 F. was often noted, but it lasted not more than fifteen to thirty minutes. The pulse rate was either unchanged or slightly increased. Respiration was never affected. On the whole, these findings, even if they are only of slight character and duration, suggest a systemic effect (Jacchia). Deutsch, however, regards the action of histamine as purely local.

A.G.N.

4. BISSET, A. A.: Histamine in Rheumatism, *The Lancet*, 1933, **1**: 988.
5. BISSET, A. A. and WOODMANSEY, A: Histamine in Rheumatism, *The Lancet*, 1933, **2**: 1018.
6. SHANSON, B. and EASTWOOD, C. G.: The use and Action of Histamine in Rheumatism, *The Lancet*, 1934, **1**: 1226.

THE WEATHER, HEALTH AND HOSPITALS

MUCH attention has been paid of late to the relationship between climate and disease, and some of the observations made may stimulate general interest in the preventive and therapeutic possibilities of air-conditioning. Of particular interest are the recent studies by Dr. C. A. Mills, Professor of Experimental Medicine at the University of Cincinnati, who has found, for instance, that protracted high temperatures, particularly in association with high humidity, produce a definite lowering of the general metabolic tone and energy level of the body, associated with a marked drop in resistance to infection. Such an acute infectious disease as acute appendicitis tends to be most frequent where storm temperature changes are widest, and to be most deadly during

heat waves of summer. Doctor Mills finds that the death rate for appendicitis is highest in the Gulf States (13 per cent) and lowest in Canada (5.2 per cent); however, in the North during summer heat waves the attacks sometimes are almost epidemic in character, with frequent perforation and rapidly spreading peritonitis. Also a study of Ohio-born whites with tuberculosis revealed an average course of 22 months, while in southern whites in the same Ohio institutions the course was but 11 months. Whites from the north and south of Europe manifested a similar ratio.

Studies reveal that there is a great crescentic trough on this continent where the temperature and barometric levels manifest the greatest variations during the year. This area sweeps westward just below the Great Lakes, up through the Dakotas, and then northwestward through the prairie provinces. Statistical studies are said to reveal in this area the highest incidence of katabolic diseases, such as thyroid disease, nephritis, diabetes, etc.; respiratory complaints are also most common. Apparently, while the cold of the north is a distinct energy stimulant, too much variability has distinct drawbacks. Barometric fluctuations seem to be very disturbing to the body also; variations in the loss of water may be quite pronounced and the barometric vagaries would seem to have a definite bearing on the incidence of suicides and homicides.

Certain inferences are obvious. Where acute infections occur during heat waves, the post-operative course should be improved by lowering the temperature of the room. Cooling by the use of fans is not advisable, because of the danger of pneumonia. Air-conditioning could effect this change, but the drop in temperature should not exceed 15 degrees F. below that of the outside atmosphere. Some of our theatres overdo it. In the South this cooling is even more imperative than it is in the North. It is recommended that in both the hospital and the home night ventilation of the sleeping chamber in winter should not produce a drop in temperature of more than 35 degrees F. This would be to avoid overstimulation from too great variations in temperature, a factor which may be important in producing March breakdowns. Doctor Mills' observations would indicate that tuberculosis patients should be kept in a fairly even temperature, avoiding the excessive heat of summer, to prevent lowering of resistance, and avoiding excessive winter cold, because of overstimulation.

Inasmuch as full air-conditioning of already constructed buildings would be an expensive undertaking, the logical development would be the installation of individual units, which, besides being less expensive, meet the likely situation that varying temperatures would be prescribed for different patients. Some of the newer construction is anticipating a definite demand on the part of the medical profession for these facilities and proper temperature insulation, and is arranging space for the requisite ducts, etc.

In discussing this subject at the recent convention of the American Hospital Association, Mr. James Govan, a well-known Toronto architect, brought out some pertinent facts showing how essential proper insulation is in any plan for air-conditioning. Rooms facing east or west actually get more direct sunlight than those facing south, particularly in the summer. In a well-insulated building heat is as difficult to get out as to get in; therefore, window absorption in summer is a big factor; to prevent heat absorption blinds or shutters should be outside, not inside, the windows. In planning the heating of a building the effect of cold walls is not always considered. For instance, at zero temperature outside, ordinary walls have an average temperature of 55 degrees F. and single glazed windows, 17 degrees F. At zero temperature the single glazed window may be 15 degrees colder than a block of ice filling the same aperture! Moreover, in the average hospital room the patient is lying near approximately 100 square feet of outside wall surface, which in winter averages about 20 degrees colder than the skin surface. This is an important factor in considering heat radiation from the body surface. While some studies, particularly on insulation, have been done primarily for the sake of effecting economies in heating, these and many others, including research in humidity and barometric control and in ionization, are proving of the utmost value in determining whether or not, and to what degree, air-conditioning will be considered essential in the near future.

HARVEY AGNEW.

Editorial Comments

The St. John Ambulance Develops An Outstanding Public Asset

The results of the Annual Dominion Trophy Competitions of the St. John Ambulance in First Aid and Home Nursing were published not long ago. In this connection, the attention of our readers is invited to the following points:—

1st. When the members of a team of First Aiders secure the necessary instruction and acquire the requisite skill to enable them to be accepted as contenders in these Competitions, they must have made of themselves a valuable asset to the community in which they live, as any one of them has become able to take intelligent charge of an accident, to take the necessary steps to keep the victim alive if at all possible, until the services of a doctor become available, and, by the proper handling of the patient, to prevent further injury.

2nd. In the 1934 competition for the various trophies, after the necessary eliminations, there were 142 contending teams in 50 different towns and cities, scattered from the Atlantic to the Pacific.

3rd. It will be easily seen, that whether winners or not, the value of these teams to the community is nearly the same, and is inestimable. J. T. CLARKE

Atlantic City Next June

Arrangements are proceeding apace for the joint Annual Meeting of the American and Canadian Medical Associations which is to take place at Atlantic City from June 10 to 14, 1935. Many years ago, probably forty, the idea was broached of having a joint meeting of the two Associations, but nothing came of it. Now, things are different and the project has been taken up again, at long last, with enthusiasm. The Executives of the two Associations have decided, without a dissenting voice, to try the experiment—an experiment which is bound to succeed brilliantly if all concerned put into it their best effort. Be it remembered that this is not an Annual Meeting of the Canadian Medical Association held, for once, outside the bounds of this country. It is much more than this; it is a combination, not, this time, in restraint of trade, but for the promotion of good will. The object is so eminently sensible that it should enlist the earnest cooperation of all our members. Our American confrères, though outnumbering us so greatly, have expressed their desire to see the Canadians take their full "place in the sun". In fact, they are disposed to treat us with all generosity in the matter of arranging the program. It is for us to ensure that we are adequately represented on that program. We should see to it, on this notable occasion, that our leaders, those in academic positions, our research workers, and those with wide practical experience in the clinical field, are in the front line. It behooves us, indeed, more than ever, to put our best foot forward. We are proud of Canadian Medicine; let us see to it that we offer nothing less than our best at Atlantic City. It is not too early to start thinking about the matter *now*; we are informed that the Americans have already completed their program. Get in touch at once with our Central Program Committee, of which Dr. Alexander Primrose, of Toronto, is Chairman. A.G.N.

The Late Dr. H. M. Little

At a meeting of the Editorial Board of the *Journal*, held on October 24th, the following resolution was passed and ordered to be spread on the minutes.

"The Editorial Board hereby record their deep regret at the death of Dr. H. M. Little. In Dr. Little the Board feel that they have lost a very warm supporter and wise counsellor. He leaves a memory of a personality full of warmth, of courage, and of unfailing enthusiasm and cheerfulness. He always expressed himself frankly, and the sincerity of his opinions was never questioned.

The Board desire to extend their sympathy to Mrs. Little in her bereavement."

Dr. Harvey Agnew

Our readers will join with us in expressing to Doctor Agnew our sincere sympathy with him over the serious accident which has befallen him. We are pleased to learn, however, that, in spite of severe injuries, he is making a satisfactory recovery and will not likely suffer any permanent disability. We all hope this may be the case. A.G.N.

The Advertising of Patent Medicines Over the Radio

The Canadian Radio Commission is working with the Department of Pensions and National Health to control the advertising on patent medicine broadcasts. The Department acts as censor of the script submitted. There is a practical difficulty in that there is no routine check of all the broadcasts to show that the censored script is followed. It is suggested that the medical profession might assist by reporting apparent breaches of permissible latitudes in patent medicine broadcasts to the Radio Commission through the office of the General Secretary. GRANT FLEMING

Special Articles

SOME TRADITIONAL BELIEFS ENCOUNTERED IN THE PRACTICE OF PÆDIATRICS

BY EDWARD A. MORGAN, M.B.,

Toronto

During the last two or three years I have been interested in the number of time-honoured beliefs which keep cropping up in the practice of pædiatrics. These beliefs have been passed from generation to generation, and are so implicitly accepted by a large percentage of the lay population and by a surprisingly large percentage of the medical world that they are almost impossible to eradicate. I think you will agree with me that the practice of pædiatrics is difficult enough without the added complications introduced by a number of irrational and incorrect conceptions.

The origin of a few of these beliefs can be traced back to mediæval medicine and are even found in the works of such authorities as Hippocrates and Galen. A very small number contain sufficient scientific truth to justify their existence, but the great majority are the result of some queer superstition or of inaccurate or confused observations. I must confess to a great sympathy with the possessors of these beliefs. Doctrines which have been taught us since early childhood are not easily abandoned, even though the exercise of a little common sense would justify this. How many of you, even now, can pick up a toad without the thought flashing through your mind about the possible development of warts? Or can you walk in bare feet through the foam along the lake shore without a single qualm? And how many of you, if you had to remove a splinter from your finger, would choose a pin rather than a needle for the operation? I venture to say that your mental reactions would be as follows: "Cold reasoning dictates that there is not the slightest excuse for any uneasiness, but at the same time I dislike touching a toad, I shall avoid the foam on the shore and I shall certainly choose the needle for the removal of the splinter". The lay public does not reason at all; it accepts blindly and without question what it has been taught by the laity of the previous generation, and to a large extent by the medical profession of other years. It would be surprising indeed if they did not believe.

During the past year I have collected a number of these beliefs which I am submitting for your consideration. I have not included in the list any which are founded purely on superstition, religion, or ancient tribal customs. These are gradually being discarded in the average civilized community as the result of widespread public health instruction. Those I have included are those encountered every day in the practice of pædiatrics. Some of these can be traced back to the middle ages; others I suspect are of fairly recent birth. My own conviction is that none of these can bear the light of either scientific or common sense teachings, though it is possible you may not all concur in this conviction. In a few there is some vestige of truth, but cause and effect have been mixed to such an extent that the logic is destroyed.

The numerous superstitious beliefs regarding the etiology and cure of warts I have omitted, though a study of them provides very entertaining reading. Similarly cures effected by the wearing of charms, etc., have not been included, though such therapeutic measures have not been entirely discarded by thinking people of the present day. We not infrequently hear of a gold wedding ring being rubbed on a stye (it is essential, by the way, that the metal be gold), or of a locket being worn on the neck for goitre, or an old stocking around the neck for a sore throat, or a bag of bluing for a bee sting, or a horse chestnut in the pocket to ward off rheumatism, or a velvet band around the neck for the teething infant, or carrying camphor to prevent influenza, or taking the child to the gas house to cure pertussis, or rubbing camphorated oil or goose grease or onion oil on the chest for bronchitis. It is no easy matter to persuade the parent that these agents, the efficacy of which she has proved many times, are valueless. And, finally, I have avoided all reference to the commonly accepted beliefs regarding dentition, for fear of the storm of abuse which would descend on my defenceless head. Also, with the object in view of determining whether these superstitions are purely local or if they exist in other parts of the world I sent out six or eight lists to pædiatricians in the United States and England asking them if they would let me know if they were familiar with them. Their replies confirmed my impression that these beliefs are widespread and not local.

In the following list you will recognize many old friends. I have endeavoured, where possible, to trace their origin or their justification for existence.

1. That a cut between the thumb and first finger will result in lockjaw—an ancient belief very commonly believed at the present day. It probably had its origin in the frequent infection of tetanus suffered by gardeners. The

injury to the hand was sustained by a cut with a sharp stone when pressing the young plant into the soil. The legend also seems to have some connection with the prevalence of lockjaw among the reapers of grain. The grain was held in one hand and cut by a scythe or sickle held in the other hand. If the sickle slipped the edge was caught between the finger and thumb and since the blade was constantly in contact with the soil, tetanus frequently developed.

2. That wearing rubbers in the house is a cause of weak eyes. There does not appear to be the remotest connection between the cause and effect, but I have found this belief recorded in writings of the nineteenth century.

3. That if a child has a penchant for eating stones, sand, etc., there must be something lacking in its diet. As far as I can discover, this is a modern belief and one frequently heard. It probably owes its existence to the great stress that has been given to errors in diet in the last decade or two.

4. That there is some deleterious factor in the night air. How often we have heard the protest from the mother: "But Doctor I can't leave the baby out after dark on account of the night air." If the protest were based on the absence at night of the beneficial sun's rays one could sympathize with the belief, but in the mother's mind the danger lies in some imaginary difference between the night air outside the house and that inside.

5. That a stomach upset causes a cold. Here there is a definite confusion of cause and effect the result of a pardonable faulty reasoning in those cases where a respiratory infection is preceded by a gastrointestinal upset, lasting twenty-four to forty-eight hours. This is of course, merely the invasion period of the infection.

6. That damp air is bad for a cold. This belief is one that is accepted by the laity as a whole and almost universally sponsored by the profession. The parent is instructed by the physician to keep the child, suffering from croup or bronchitis, indoors in damp or foggy weather. The next instruction is to put the child in a steam tent or to keep a kettle boiling in the room to maintain the humidity of the air. In the same breath, the parent is warned of the irritating effects of dry air, and if the patient is a victim of frequent attacks of bronchitis, the lack of humidification in the house is held responsible. Could anything be more inconsistent?

7. That picking the nose, grinding the teeth, voracious appetite, or anorexia are symptoms of worms. These symptoms were described by early writers on pædiatrics. I found them in the works of Thomas Phaer (1545), and they have been copied into every text-book of pædiatrics up to the present day. It is not surprising that they are universally accepted by the lay public.

8. That a persistent cough can turn into tuberculosis. This is a perfectly natural belief, and one that I am afraid has been sponsored too often by the medical practitioner, who has endeavoured to justify a rather tardy diagnosis.

9. Looking over the baby's head from behind will make it cross-eyed. This is one of the many superstitions dealing with the eyes, and should be coupled with one heard infrequently now, that if a child crosses its eyes and the wind changes the eyes will remain crossed.

10. That a child should not eat a big meal before going to bed. The exercise of a little common sense would show the folly of this belief. Nursing babies do little else for nine months but consume a big meal and then go to sleep, and up to the age of three years the mid-day meal, which is the largest in the day, is followed by a sleep.

11. That meat should not be given at the evening meal. The awful result attendant upon this procedure I have never yet discovered. One feels, however, that if our patients with chronic intestinal indigestion can tolerate three or four tablespoonfuls of meat at the evening meal a normal child should not be upset to an alarming extent.

12. That eggs are bilious. This belief probably owes its origin to the gastrointestinal attacks occurring as the result of specific idiosyncrasy, but I find it difficult to persuade the mother that more than one egg a day in the child's diet will not be injurious.

13. That it is essential that the garment next the baby's skin be made of wool, and that it is very dangerous to change abruptly from wool to cotton underwear. Both these precepts are included in medical teachings of the seventeenth century. The old Scotch proverb, "Ne'er cast your clout till May be out", is gradually losing its force as the result of modern investigation and teaching.

14. That a pin used to remove a splinter will produce blood poisoning. The probable explanation of this superstitution is connected with the old belief that brass objects were particularly poisonous. Fifty years ago most pins were made of brass, but latterly the large proportion are made of iron and then nickle-plated. An analogy is the belief that brass objects in the baby's mouth will poison it. Another explanation, advanced by Dr. Spohn, of Vancouver, is that the belief is associated with infections occurring from pins held in the mouth and then used as a surgical implement.

15. That there is something particularly poisonous about stepping on a *rusty* nail. The frequency with which tetanus and ordinary pyogenic infections followed deep punctured wounds no doubt gave rise to this belief, and it is not surprising that the rust itself was blamed.

16. That a cut with tin is likely to become infected. Apparently the laity still cherishes an ancient grudge toward both tin and brass.

Both metals are credited with poisonous attributes. Aluminum is another metal which very recently has fallen from grace. Foods cooked in this metal are believed by many people to be poisonous.

17. That the dye in stockings will poison a cut. In seeking the cause of the prevalence of infections of the feet it is strange that the dirt in the stockings was not suspected rather than the dye. As a matter of fact if the dye possessed any properties at all they would be mildly antiseptic.

18. That piercing the ears for ear-rings will strengthen the eyes and prevent squint. This is a very ancient belief among the Indians and French Canadians, but I find no mention of it in early medical writings. Sailors and buccaneers of the middle ages believed implicitly in the efficacy of ear-rings as a preventative against blepharitis. This disease was very prevalent as the result of the constant contact of the eyes with salt water.

19. That touching the soft spot on the baby's head is attended by great danger. This superstition crops up whenever a mother is instructed to remove the seborrhœic scales from the fontanelle and it is with difficulty that she is persuaded that the operation is not attended with danger.

20. That a coated tongue can be cured by laxatives. I feel that the relegation of this time-honoured belief to the realm of discredited superstitions may provoke some criticism, since I know it is accepted as true by the great mass of the profession. For my own part, I confess that I have not the remotest idea what the coating on a tongue consists of, where it comes from, or what derangement of the human organism it is most frequently associated with; nor have I found any practitioner, or pathologist who has any more definite views on the subject than I have. It is found fairly uniformly in upper respiratory infections, but whether it is the result of mouth-breathing or of the infection itself is not certain. Alvarez in his book on the Physiology of the Stomach asserts that the coating on the tongue is the result of regurgitation from the stomach, but he does not define its composition or explain why it adheres so tenaciously to the tongue. Of one thing I am firmly convinced, *viz.*, that it cannot be removed by the administration of laxatives.

21. That no fruits containing seed, such as grapes, figs, etc., should be given for fear of appendicitis. A belief which contains a certain modicum of truth, but one which is gradually becoming less popular.

22. That eating raw oatmeal will produce intestinal worms. No doubt associated with the maggots frequently found in various cereals.

23. That the rash in infectious diseases stays in, or strikes in again after appearing. Though there are rare instances of infectious diseases without an eruption, the majority of such cases are probably due to faulty diagnosis. The disappearance of the rash after once appearing may be the result of cardiac failure, and would thus explain the apprehension with which the laity regards this event. I found the same fear expressed in the works of Thos. Phaer (1545), and also the advice regarding the efficacy of hot drinks to bring out the rash in measles.

24. That during measles, light injures the eyes. Of all the beliefs that I have cited, I think this is the most universally believed and probably the most fallacious. It is accepted without question by the laity and is fostered by the profession. The fact that during the acute stage of measles it hurts to look at the light has been interpreted to mean that light actually injures the eyes. For this belief, as for many others, the teachings of the medical profession are responsible. Bagellardus, in 1472, warns the mother to shield the baby's eyes from the light for fear of blindness.

25. That a key placed over the spine will stop a nose bleed. William Heberden in 1807 advised that a cold object be placed on the back, or the hands immersed in cold water.

26. That the baby's finger nails should never be cut with a pair of scissors. This probably owes its origin to the difficulties attendant on the operation. The proper procedure is for the mother to bite them!

27. That fat babies are more apt to develop pneumonia than thin ones. A very old belief, and one that I unearthed in the writings of Walter Harris (1689) as follows: "He wheezes also and draws his breath so hard as to disturb the ears of those who stand by, which symptom is always found to affect him, especially if he is fat, whenever the disease is of the acute kind".

28. That a disease can .be contracted by breathing certain odours, such as sewer gas, or the emanations from a marsh. Here the connection is obvious — sewer gas *per se* is not poisonous, but its presence is a warning that pollution of drinking water probably exists. The association of odours from a marsh with disease is undoubtedly linked with miasmic fevers such as malaria.

29. That a child should not be permitted to go to sleep after an accident or after drinking an opiate for fear that it will never waken. This is another very old belief and one that is accepted and practised in the present day. It is so obviously a confusion of cause and effect that it requires no discussion.

30. The following deserve a passing reference only, because of the frequency with which they are encountered: That tickling a baby's feet will make him stutter. That a baby should not

be bathed shortly after a meal: I found this advice in pædiatric writings of the 15th century. That the flannel next the baby's throat or chest during a cold must be red. That a cat can kill a baby by sucking its breath.

Although we as a profession are apt to ridicule these beliefs, we must not forget that a great many of them were conceived by our medical ancestors, and are being still fostered by our contemporaries. We would be well-advised to analyze a little more carefully some of our own modern methods of treatment, which, one hundred years hence, will, without doubt be included in just such a paper as I have presented today. Take, for example, the use of camphorated oil for chest colds, turpentine stupes for abdominal distension, and bacterial vaccines for the prevention of respiratory infections. The last-mentioned is from a scientific point of view particularly unsound in view of the fact that we do not even know the nature of the organism which produces the common cold.

Let us therefore, as a profession, before we attempt to cast contumely and ridicule on these ancient beliefs, see that our own house is in order, otherwise we shall fall under the condemnation of a certain physician of the seventeenth century, with the modest appellation of Franciscus Perez de Guadalajara, who voiced his disapproval of the popularly accepted beliefs of that day in the following bombastic and arrogant manner.

> "I am not at all surprised that women—the bane and corruption of the human race—and after all they are women—hold and cling to these beliefs, but I do regard it as a matter of surprise that men, who should be respected for their age, and revered for their commonsense, and held in high esteem everywhere for their knowledge, should follow the beliefs of the common people and of silly women!"

Men and Books

HOWELL'S "SHEPHERD"

BY SIR ANDREW MACPHAIL,

Montreal

There are two ways of writing biography. The first is not to write it at all; the second is to tell the truth. A subject who cannot stand the truth, or whose friends and family resent it, had best be left to oblivion. Dr. Howell has chosen the better way. He has written the truth about Shepherd; his family, secure in his memory, has held nothing back. He has, as the Apostle recommends, spoken the truth in love; and now he may safely put to the world the plaintiff appeal of that same apostle: Am I an enemy because I speak the truth.

"Francis John Shepherd, Surgeon, his Life and Times", by William Boyman Howell, a book of 242 pages, is newly published by J. M. Dent. The title gives inadequate knowledge of the contents; the life of a surgeon, apart from his surgery, is not usually remarkable; the history of his times, little more than a local record. But any life and times can be made interesting by art. That is what Dr. Howell has done; and Shepherd by his variety and conflict of qualities is an interesting subject for artistic presentation.

The book is more than a book; it is a picture. The central figure, Shepherd, is drawn with firm sure strokes; the subsidiary figures are lightly but none the less surely sketched; the academic and hospital background is suggested with full decorative effect. In any review of the book there is danger lest the figures be distorted and the features blurred or made too prominent. The present intent is to tempt and persuade any reader of this writing to have resort to the book itself.

Two questions a reviewer or critic must address to himself: Is the thing worth doing? Is it well done? The time in which Shepherd lived is the most important in the history of science, and he had the scientific spirit. He was a sure teacher; he impressed his method upon fifty successive classes of students; he animated them with his own spirit; he established a school of thought. Of the present medical faculty at McGill, thirteen members out of twenty-eight were students under him; twenty-seven of the thirty-four assistant professors; thirty-eight out of the forty-nine lecturers. Besides all this, he had that touch of originality or genius that sets a man apart as a character. And the book is well done.

Francis Shepherd, Frank, as he was more intimately known, graduated from McGill in 1873, at the age of twenty-two. In the autumn he went to London to attempt membership in the Royal College of Surgeons. There is now a touch of the comic in his fear that he might be "plucked" in anatomy; he seemed to know nothing about it. In the following spring he passed the primary, and in July the final examination. He did not think much of the equipment he brought from McGill. He required a year's study before passing that somewhat elementary examination. Upon his return, he received his first appointment, demonstrator of anatomy in 1875; four years later he gained entrance to the General Hospital, and in 1883 he was made professor of

anatomy and attending surgeon,—after ten years of working and waiting.

From that earlier year dates the renascence of McGill. It was he and Osler who brought the new spirit, but Osler left in 1884; and from that day until the end of his career Shepherd was an influence in carrying the medical school and hospital from the dark age into the light, and setting it on its course towards world repute. Leaving these high matters at one side, let us turn to the book for the brilliant revelation it makes of Shepherd himself; his whims and humours, his caprice and prejudices, his likes and dislikes, his plain speech, that adorned a sincere simple character and honest nature.

It is a common defence by those who fail in the practice of medicine that their failure was due to their dislike of the "bedside manner". Dr. Shepherd was not an immediate success; in the first year he made less than a hundred dollars. Dr. Howell admits that he was tactless, and appeared unsympathetic, that he made no attempt to ingratiate himself with his superiors, that he had too little "humbug" in him to use any of the artful devices considered legitimate advertising in the medical profession. "Humbug" is not an asset in medicine; one who has those other defects had better choose a different profession. Shepherd succeeded by quite other means; he was in earnest; he had industry, ambition, and commonsense; his keen intellect was developed by an excellent scientific education. Whilst these qualities were making themselves manifest, and the adverse ones were being repressed, it was well for him that "he had his father to back him".

Shepherd was always in the right; therefore any one who disagreed with him was in the wrong. He was so honest and well informed that any one who expressed dissent must be dishonest or ignorant. And he was so honest that when he thought ill of a man he considered it dishonest to conceal his opinion. He left these opinions in written notes which Dr. Howell found and faithfully brought to the surface. He was too careless of the pain he caused by his blunt speech; he was not delicate. "The worst liar I ever knew" was his comment upon the picture of a dead colleague. He was born to set the world right; but in the end such an one is left alone, and the world goes on.

For nearly forty years he taught anatomy by a consistent and infallible system. Auckland Geddes who succeeded him in the chair had the temerity to introduce a different method, although for the first session "he was content to go on pretty much in the old way." Shepherd thought him "an admirable instructor". Later, however, "he made some alterations in the course", without consulting him. As a result, Shepherd then thought of him "as a man with little tact, dogmatic, and always sure he was right". When Geddes, after his phenomenal career, went to Washington as British Ambassador, Shepherd "hardly thinks he is the man for the post, for he has little sense of humour, no tact, not much of a diplomat." "However", he makes the unusual admission, "I may be mistaken".

It is an easy guess why Geddes changed the course, coming fresh from the European schools. Shepherd by his domineering nature had convinced the faculty that the only way to learn anatomy was by listening to his daily lectures for two years, by looking at the excellent coloured pictures he drew upon the board, and by the laborious dissection of decayed bodies for four to six hours every day. There was not in the dissecting-room an articulated skeleton, not a prepared section showing the structures, nothing but a book and a corpse. No bones were to be seen unless the student hired them from the janitor who had a secret store; and the bone most in demand was the femur which could be used as a weapon of defence in the frequent clashes with the police. Geddes was familiar with the vast London museums where every structure of the body is beautifully displayed in all its relations, dissected, and labelled with printed letters. All this, Shepherd thought, was a "short cut" to anatomy, and not quite honest. Whilst it is true that the study of anatomy is the surest means of converting a layman into a physician, anatomy is not the whole of medicine. Shepherd was so profound an anatomist that, when he grew old and his sight was failing, he could operate by dead-reckoning; he would tie an artery because he knew a nerve had no right to be there.

Shepherd's friends are made as interesting as himself. Dr. Howell assembles the group: George Ross, William Gardner, R. L. Macdonnell, James Stewart, William Osler, and others. Macdonnell was his assistant demonstrator, and appears to have modelled himself by his master. As Shepherd said of him, "He could see no evil in his friends, but those whom he disliked got short shrift." Possibly the author makes too much of their propensity for practical jokes, for that practice is always silly; sometimes it is dangerous, and it always has an element of cruelty. He relates that Osler once received a letter which would have an important effect upon his career, but he refused to answer it, as he thought it a forgery by one of his friends. He also tells us that Shepherd was arrested in Moscow because he had left his passport at the hotel. He sent a message to Gardner, who did not hurry to his rescue, and when he came, denied that he knew him and left him behind the bars for an hour.

The hideous practice of robbing graves and selling the bodies by which certain students paid their fees and living expenses, is described in gruesome detail. Shepherd and the faculty

were a party to this "offence against decency". No need is great enough to justify it. One who now committed the crime would receive the execration of his fellow students. Dr. Howell contrasts in high relief the coarse conduct of medical students, and of professors too, in those days with the gentle demeanour that now prevails. He tells of one professor who threw off his coat in class, and offered to fight a student who offended him. Shepherd adopted a milder method; he asked a man to stand up, to show if he yet wore short pants. Students are too easy a mark for sarcasm, but style in humour changes. George Ross recommended a student who was enduring his final examination to study for another year, when he might know as much as a nurse. To a student in a like situation who would instil atropine into a glaucomatous eye Frank Buller said, "Not this year, by G——, you won't".

Shepherd lived at the juncture of the old surgery with the new, and he was the one who did most to bridge the gap. He also observed the transfer of the old nursing to the new. In the earlier days the nurses partook somewhat of the nature of charwomen; they were coarse, ignorant, dirty, but not much dirtier than the surgeons. They drank the universal remedy prescribed for patients. He had operated upon a patient for strangulated hernia; he had a natural curiosity about the result; he went to see him in the evening; he could not find the nurse, as she had three wards to supervise, but he found the patient in his night-shirt sitting on the verandah smoking a pipe, after he had enjoyed a supper of tap-water, bread and milk. Next night he found the patient gagged and strapped to the bed. In spite of this precaution he died of pneumonia.

Few great men are free from vanity, and it would appear that Shepherd had his share. He was easily offended. In a field which he preempted as his own he would allow no rival. Early in life he set himself up as a pontiff in the new world of art. It was an easy triumph, since in the company of the blind, as Montreal then was, the one-eyed man is king. And he retained this position even after his own eyes were clouded by cataract and had lost the perception of colour. As president of the Montreal Art Association and an adviser to the National Gallery he continued to recommend pictures on the ground of personal predilection rather than abstract merit. He had always been fond of pictures. At first the genre and story-telling pictures attracted him most; he knew little of quality, tone, or values. He did not like Turner. The colour of the Italian school could not overcome his neutrality towards religious pictures. He thought Landseer wonderful, "especially the Lake pictures with deer in them". But he improved his mind and educated himself to an appreciation of things artistic. One who expressed a contrary opinion of a picture thereby convicted himself of ignorance. That is what befell the director of the British School of Archæology in Rome, whose collection of prints was afterwards purchased by the Vatican. He was rash enough to doubt the authenticity of a "Canaletto" in the Montreal gallery. On one occasion at dinner Shepherd sat beside J. Pierpont Morgan "as they were both interested in art", but he soon found that Morgan "knew nothing about art". Dr. Howell makes much of the advancing price of pictures that Shepherd advised in vain should be bought; he does not tell us the price they would fetch today.

To secure an appointment to the hospital, he had to run the gauntlet of the lay governors. To solicit votes was to one of his temper "a most humiliating" experience. He was elected by a majority of twelve, but Dr. Howell quotes a current medical journal as authority for the charge, that "his backers were none too scrupulous in their methods". He might have added that the journal was edited by his opponent. The practice of aseptic surgery devised by Lister in 1867 was brought to Montreal by Roddick in 1877, two years before it penetrated into Germany. Shepherd seized upon it at once, and made it his own. The author is wrong in describing moist dressings and the carbolic spray as part of "Lister's early technique".

He demanded complete submission from his subordinates, but at the first sign of revolt he drew back. They soon discovered that his bark was worse than his bite. His moods were put on like a garment and were no essential part of himself. To the older surgeons their "dressers" were a fair object of jest. Sir Frederick Treves himself was not free from the habit. "Can you tell me", he asked one of them, "why my dressers know nothing?" He was brought to bay by the answer, "Possibly, because they learn it from their Chief". Henceforth there was peace.

Shepherd would make "an exhibition of petulance", by throwing instruments on the floor or even out of the window, for the amusement of seeing a docile house-surgeon pick them up. A new and more confident house-surgeon let them lie; the performance was never repeated. He would even ask for an instrument that had no existence; but he would allow no one but himself to make merry at the expense of the staff.

Dr. Howell employs the word "contradictious". When Shepherd grew old and his power had passed with his resignation from his various posts, his younger colleagues would amuse themselves at his expense by arousing that spirit. He then encountered the fate of the old lion in the fable. Even in the days of his power, it was discovered that the surest way of winning

his support was by pretending to desire a decision contrary to the object. He was not much sought for consultation, as he was apt to contradict the attendant even in presence of the patient. On more serious subjects, when he was deputed to ascertain the formal opinion of his colleagues, he was disposed to ascribe his own opinion to them.

Students have a faultless instinct in discerning a teacher. For honesty they have respect. To a teacher who gives of his best they yield affection and gratitude. To Shepherd was granted all this, and in addition an element of fear; for he had in his hand the weapon of examination which he used fairly but without pity. He won also the respect of surgeons throughout the world; he visited them, watched their work, and learned from them. He gained all the honours the profession can bestow, presidencies, fellowships, and honorary degrees. His place is secure in the mind and heart of his students, and colleagues, now themselves grown old, and in the great mind of the profession. That place will be made the more secure by the delicate raillery of this little book.

Hospital Service Department Notes

The Unrecognized Tuberculosis Patient in the General Hospital

Those whose responsibility it is to guard the health of the student nurse have in recent years paid increasing attention to what would appear to be a comparatively high incidence of pulmonary tuberculosis among nurses in training or recently graduated. Despite the fact that the physique of probationers is carefully checked, statistical studies would indicate that the incidence of tuberculosis in nurses is probably from one and one-half to even four times as great as among the general population of young women. The Committee on Research of the Canadian Hospital Council is making a special study of tuberculosis in nurses, and its final report will be awaited with interest. Various factors, including the prolonged hours, the arduous work, and the off-duty activities have been named, but undoubtedly contact with "open" cases of tuberculosis in the hospital is a major factor. Moreover, the fact that nurses in tuberculosis sanatoria are so seldom affected would indicate that the greatest menace is the *unrecognized "open" case* admitted to a general hospital for an entirely different condition. All too frequently the patient does not realize his infection, or may prefer not to say anything about it; the cough may be ascribed to the anæsthetic. Unfortunately the danger is all the greater because of the age of the pupil nurse, and, perhaps, because of her lack of resistance from infrequent previous contact before taking up training.

In general hospitals where routine physical examinations are carefully done on all patients (and on all employees) it is possible to detect many such open cases, but, unfortunately, in most hospitals routine examinations, particularly of private patients, are not so rigidly enforced as they might be. Some years ago the Royal Inland Hospital at Kamloops, a general hospital, with the cooperation of the staff of Tranquille Sanatorium made radiological studies of all admissions, irrespective of diagnosis, and we understand that a surprising number of unsuspected cases were discovered. For some time the Vancouver General Hospital through its tuberculosis unit, which is under the able direction of Dr. W. H. Hatfield, has been conducting a most laudable routine in this direction. The files of the tuberculosis unit contain records of some 30,000 persons in the Vancouver area whose tuberculosis history or contact has been studied. By a most laudable arrangement, the Health Department notifies this tuberculosis division of all cases reported to it. The list of admissions to the general wards is sent daily from the admitting department to the tuberculosis division record office; there all new admissions are checked against these records and the general office is immediately notified if any of the new admissions appear on the tuberculosis clinic records. While not all cases of tuberculosis unwittingly admitted to the hospital can be detected by this means, it is apparent that the great majority of possible cases can be so detected, to the obvious advantage of both the other patients and the nurses. Moreover, in this hospital, as in the University Hospital at Edmonton and several others, a routine sputum examination is done on every patient with a cough, irrespective of the apparent cause. While most examinations prove negative, every now and then the discovery of an unexpected positive case vindicates the effort expended. An additional advance effected by the Health Department is the framing of a law whereby patients with positive sputum can be detained in hospital even against their will.

In concentrating attention upon the danger of the unwittingly admitted tuberculosis patient, one should not overlook the possibilities of harbouring an open case among the sub-staff. General hospitals are paying increasing attention to the health of their nurses, but not many give as careful attention to the health of the other employees—the maids, the orderlies, the office staff, and the kitchen and engineering staff. The first two groups particularly are daily in close contact with both patients and nurses, and their health is of considerable concern to all.

All communications intended for the Department of Hospital Service of the Canadian Medical Association should be addressed to Dr. Harvey Agnew, 184 College Street, Toronto.

Association Notes

JOINT MEETING
AMERICAN MEDICAL ASSOCIATION — CANADIAN MEDICAL ASSOCIATION
ATLANTIC CITY, N.J., JUNE 10–14, 1935

On November 10th, Dr. J. C. Meakins, President-Elect of the Canadian Medical Association, Dr. Geo. S. Young, Chairman of Council, Dr. A. Primrose, Chairman of the Central Program Committee, and the General Secretary attended a meeting in the offices of the American Medical Association, 535 North Dearborn Street, Chicago, at which twenty-five representatives of the Council on Scientific Assembly of the American Medical Association were present from many parts of the United States. Plans for the forthcoming convention were developed in a manner extremely satisfactory to your delegates.

The delightful hotel, Haddon Hall, has been made available as Canadian Headquarters. The rates are as undermentioned:

EUROPEAN PLAN—Room and bath, one person, per day, $3, $4, $6, $8; two persons, per day, $5, $6, $8, $10.

AMERICAN PLAN—Room and bath, one person, per day, $6, $7, $9, $11; two persons, per day, $11, $12, $14, $16.

Reservations may be made direct to the hotel.

The Council of the Association will convene on Monday and Tuesday, June 10th and 11th. Scientific Sections and General Sessions will be held on Wednesday, Thursday and Friday, June 12th, 13th and 14th.

We have undertaken to officer from the Canadian side all the Sections which will be meeting. To that end, personnel has been appointed as undermentioned:

COMMITTEE IN CHARGE OF THE CANADIAN DIVISION

President-Elect - - - Dr. J. C. Meakins, Montreal;
Chairman of Council - Dr. Geo. S. Young, Toronto;
Chairman of Central Program Committee - Dr. A. Primrose, Toronto;
General Secretary - - Dr. T. C. Routley, Toronto.

Sectional Officers

MEDICINE —
Chairman - - Dr. Duncan Graham, Toronto;
Secretary - - Dr. K. A. MacKenzie, Halifax.

SURGERY —
Chairman - - Dr. W. E. Gallie, Toronto;
Secretary - - Dr. A. R. Munroe, Edmonton.

OBSTETRICS AND GYNÆCOLOGY —
Chairman - - Dr. John Fraser, Montreal;
Secretary - - Dr. D. C. Malcolm, Saint John.

PÆDIATRICS —
Chairman - - Dr. Alan Brown, Toronto;
Secretary - - Dr. Howard Spohn, Vancouver.

EAR, NOSE AND THROAT —
Chairman - - Dr. W. J. McNally, Montreal;
Secretary - - Dr. W. Hackney, Calgary.

EYE —
Chairman - - Dr. W. G. M. Byers, Montreal;
Secretary - - Dr. A. R. Cunningham, Halifax.

MILITARY MEDICINE —
Chairman - - Dr. John Gunn, Calgary;
Secretary - - Dr. W. H. Delaney, Quebec.

UROLOGY —
Chairman - - Dr. D. W. MacKenzie, Montreal;
Secretary - - Dr. E. R. Myers, Saskatoon.

RADIOLOGY —
Chairman - - Dr. W. A. Jones, Kingston;
Secretary - - Dr. H. H. Murphy, Victoria.

ANÆSTHESIA —
Chairman - - Dr. Wesley Bourne, Montreal;
Secretary - - Dr. W. L. Muir, Halifax.

PUBLIC HEALTH AND INDUSTRIAL MEDICINE —
Chairman - - Hon. Dr. W. J. P. MacMillan, Charlottetown;
Secretary - - Dr. A. Grant Fleming, Montreal.

HISTORICAL MEDICINE —
Chairman - - Dr. W. W. Francis, Montreal;
Secretary - - Dr. H. E. MacDermot, Montreal.

PHARMACOLOGY AND THERAPEUTICS —
Chairman - - Dr. V. E. Henderson, Toronto;
Secretary - - Dr. G. F. Strong, Vancouver.

PATHOLOGY AND PHYSIOLOGY —
Chairman - - Dr. Wm. Boyd, Winnipeg;
Secretary - - Dr. C. H. Best, Toronto.

NERVOUS AND MENTAL DISEASES —
Chairman - - Dr. A. T. Mathers, Winnipeg;
Secretary - - Dr. W. V. Cone, Montreal.

DERMATOLOGY AND SYPHILOLOGY —
Chairman - - Dr. J. F. Burgess, Montreal;
Secretary - - Dr. Paul Poirier, Montreal.

ORTHOPÆDIC SURGERY —
Chairman - - Dr. R. I. Harris, Toronto;
Secretary - - Dr. G. A. Ramsay, London.

GASTRO-ENTEROLOGY AND PROCTOLOGY —
Chairman - - Dr. R. H. M. Hardisty, Montreal;
Secretary - - Dr. J. K. McGregor, Hamilton.

SCIENTIFIC EXHIBITS —
Chairman - - Dr. Sclater Lewis, Montreal.

Favourable transportation rates are being arranged from all parts of the country, and will be announced later. Unquestionably, this convention, the first of its kind ever to be held on this continent, is attracting a great deal of attention in both the United States and Canada, and it should prove a pronounced success.

T. C. ROUTLEY,
General Secretary.

Provincial Association Notes

The British Columbia Medical Association

The annual convention of the British Columbia Medical Association was held at Kamloops on September 17th and 18th. The meeting was most successful and over 90 members registered. An excellent program of scientific addresses was presented by the following speakers: Drs. T. C. Conn and Heber C. Jamieson, of the University of Alberta; R. E. McKechnie, of Vancouver; J. C. Masson, of the Mayo Clinic; Wm. P. Murphy, of Boston, and F. M. Pottenger, of Monrovia, Cal. A valuable clinical demonstration of cases of trachoma was contributed by Dr. Wall of the Indian Department.

A special feature of the convention was the attendance of Dr. J. S. McEachern, of Calgary, President of the Canadian Medical Association, accompanied by the General Secretary, Dr. T. C. Routley, and Hon. Dr. G. M. Weir, the Provincial Secretary of British Columbia.

Dr. McEachern was a special speaker at a most enjoyable luncheon meeting at Tranquille Sanatorium. He spoke very strongly on the desirability of an increasing measure of national unity of the profession in Canada, and made the suggestion that, to facilitate this, the different provincial associations should change their designations, replacing the name of their respective provinces by the title Canadian, with the provincial name used to indicate the branch. Thenceforth the British Columbia Medical Association would be known as the British Columbia Branch of the Canadian Medical Association. This would insure every member of the provincial associations being a member of the national body. A feature of Dr. McEachern's suggestion which made a strong appeal to the members present was that there would be no voices crying in the wilderness on questions of policy, but when the medical profession in any locality spoke it would be with the voice of the whole national organization, the Canadian Medical Association.

Hon. Dr. Weir was the guest of honour at the Association dinner. He gave an excellent address on the subject of "Health insurance", which is a matter of intense interest to members of the medical profession in British Columbia at present, since the present government has included Health Insurance in its legislative program. For some time a special committee of medical men has been studying this subject, and the government has recently been preparing to draft a measure which is actuarially sound and is economically feasible. The special committee some time ago sent out a questionnaire to all registered practitioners in the province, to obtain if possible an expression of the general attitude and views held. Shortly after another, somewhat similar, was sent out independently from the office of the Provincial Secretary. Subsequently the statement has been made frequently that 90 per cent of the doctors in the province are in favour of Health Insurance. Since it has been learned that less than half of those in the province replied to either questionnaire, unless it is safe to assume that silence gives consent, the above statement cannot be accepted as correct. That the whole question must be viewed from both angles is obvious, and it is generally accepted that the matter of actuarial soundness is not a matter of concern to the medical profession. Hon. Dr. Weir's statement, which occurred in his speech at the dinner, that "Health Insurance is no more the concern of the medical profession primarily than education is primarily the concern of the school-teachers," is one which must not go unchallenged. It is generally felt that any measure of Health Insurance which is so dependent upon the cooperation of the medical profession and which is enacted with as little understanding of the part which the medical profession must play in it, as such a remark would indicate, cannot succeed.

A meeting open to the general public was addressed by speakers on current health problems, part of the work of the Association in education and publicity.

At the final business meeting representatives of the College of Physicians and Surgeons gave a summary of the work done during the past year.

Dr. A. D. Lapp, Medical Superintendent, of Tranquille Sanatorium, was installed as *President* for the coming year; Dr. Ethlyn Trapp was re-elected *Secretary-Treasurer*.

D. E. H. CLEVELAND

Medical Societies

The Academy of Medicine, Toronto

A special meeting of the Academy of Medicine, Toronto, was convened on October 23rd, for the purpose of hearing Mr. A. Lawrence Abel, F.R.C.S. and Dr. Ronald Jarman, M.R.C.S., of London, England. These gentlemen were returning home from the American Congress of Surgeons, where they had been guest-speakers. Mr. Abel gave a very helpful and clear talk on the operation for removal of cancer of the colon, demonstrating several modifications of the operation that were enthusiastically received by the surgeons present as representing a real advance in the technique of this procedure. Dr. Jarman gave an address on "Evipan anæsthesia". Both speakers used excellent motion picture films.

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On November 6th, at the regular stated meeting of the Academy of Medicine, Toronto, the

officers and four other Fellows of the Western Ontario Academy of Medicine, London, were our guests and took charge of the evening's program.

The following papers were presented: "Undulant fever", by Dr. F. J. H. Campbell; "The treatment of lung abscess", by Dr. M. Simpson; "Wheat germ oil (vitamin E) therapy", Dr. E. M. Watson; "Is the increase in cardio-vascular renal disease real?" by Dr. Madge Macklin.

A large number of our Fellows assembled to hear our London colleagues, and the visit was a great success.

GILBERT PARKER, *Hon. Secretary*

The Calgary Medical Society

At the opening fall meeting of the Calgary Medical Society, held at the Holy Cross Hospital on October 2, 1934, Dr. John W. Scott, of the University of Alberta, gave an address on "Recent development in our knowledge of blood diseases". He remarked that, "the past century, and indeed the past decade, have been epoch-making eras in the development of medicine along sound physiological and pathological pathways. In no field has this been more evident than in diseases of the blood, particularly the anæmias. It is scarcely a hundred years since the white corpuscle was first seen, and considerably less than that since the first blood count was done." In 1835, Nasse discovered white blood cells, and in 1851 Vierordt, did the first red blood count. In 1835 "Thomas Addison, in a thin, thirty-nine page book, gave us his matchless clinical description of pernicious anæmia. Recent acquisitions to our knowledge of the treatment of this disease have had a tremendous stimulating effect towards uncovering new facts in this and other forms of anæmia. The names of Addison, Ehrlich, Virchow are written deeply in the history of medicine".

There are certain well established facts in regard to the development of the red blood cell. The term "erythron", has been suggested recently by Professor Boycott, to include the red blood cell and the parent cell from which it arises. The erythron may be considered to be an organ made up of varying types of related cells, such as the reticulo-endothelial cells, megaloblasts, normoblasts, reticulocytes, evolving finally into the adult erythrocyte. The erythron in post-natal life extends throughout the bone-marrow and comprises almost half the volume of the circulating blood. In times of stress, as following a hæmorrhage, the manufacturing process in the bone-marrow is speeded up, and immature cells are released into the peripheral blood, as megaloblasts and normoblasts. Under such conditions, the bone-marrow shows a hyperplasia and the peripheral blood a hyperplastic picture. A slowing down, or a complete shutting down of activity in the bone-marrow, gives rise to a hypoplastic or aplastic blood picture.

The grouping of the anæmias on an etiological basis will be found convenient. This has recently been done by Ottenberg under three main headings: (1) the deficiencies; (2) injury to blood-forming organs; and (3) disintegration of blood. There are numerous subheadings to each of these.

The deficiency anæmias are most commonly met with and most amenable to treatment. The experiments of Whipple were referred to. He proved conclusively that organic iron had no therapeutic merit over inorganic iron. The hypochromic anæmias were also referred to. First described by Faber in 1909, cases have been reported by Witts in England, Wistrobe in the United States, and Mills and Adamson in Canada. They are of unknown origin and occur most often in women in the third and fourth decades.

The epochal research work of Whipple in 1925, and Minot and Murphy in 1926, on pernicious anæmia advanced our knowledge of the treatment of this disease. Minot and Murphy showed that liver feeding brought about a remission in patients with pernicious anæmia. Since these dates many new advances have been made in our knowledge of this disease. Many other types of blood disease were graphically described by Dr. Scott.

Dr. E. P. Scarlett opened the discussion on Dr. Scott's paper, and reviewed with much clarity the salient features as to the treatment of certain of the anæmias. He commented favourably on the efficiency of the Ottenberg classification of the anæmias. He stated that there is now general agreement that in order to gain the desired effect massive doses of iron must be used far in excess of those recommended in the Pharmacopœia. He expressed preference for the use of liver extract given by the intramuscular route. The response was rapid and more certain, besides being less expensive to the patient and enabling the physician to keep in touch with the patient at regular intervals. Dr. Scarlett referred to the association in certain instances of granulocytic angina with the use of pyramidon and certain of the derivatives of barbituric acid.

G. E. LEARMONTH

Montreal Physiological Society

At a meeting of the Montreal Physiological Society held on October 15th, Dr. S. A. Komarov read a paper entitled "The presence of an anti-neuritic principle (vitamin B_1) in the gastric juice", which is here given in abstract.

The presence of an anti-neuritic factor in the pure normal gastric juice of the dog was demonstrated by means of curative tests on poly-neuritic pigeons (technique as described by Guha and Drummond (*Biochem. Jour.*, 1929, **23**: 880). Gastric juice was collected on sham-feeding from three dogs with gastric fistula and œsophagotomy which were on a diet of fresh

raw meat, milk, and oatmeal porridge. Only water-clear secretion was used, and all the necessary precautions were taken to prevent any growth of microörganisms in the gastric juice or in the concentrates prepared from it. The anti-neuritic activity was demonstrated in the concentrates, which were prepared from the protein-free filtrate of gastric juice by adsorption on Fuller's earth at pH 4.5, followed by extraction of the adsorbates with $Ba(OH)_2$. The pigeon-day-dose of these concentrates was equivalent to from 100 to 200 c.c. of gastric juice, and contained 0.8 to 1.6 mg. of nitrogen and 7 to 14 mg. of organic material. In an attempt to investigate the chemical properties of the anti-neuritic constituent of gastric juice it was found that this substance belongs to the group of nitrogenous bases not precipitable by lead acetate in acid, neutral or slightly alkaline media, but precipitable by an excess of phosphotungstic acid in an acid medium (5 per cent sulphuric acid). On fractionation by the silver-baryta method all the anti-neuritic activity was recovered in the silver precipitate obtained at pH between 5.5 and 7.0. The activity of the concentrate prepared from this silver fraction by extraction with a slight excess of hydrochloric acid corresponded to 75 to 200 c.c. of gastric juice as a pigeon-day-dose. This amount of the fraction contained from 0.15 to 0.4 mg. nitrogen. The chemical properties and the mode of action of the concentrates studied strongly suggest that the active principle is vitamin B_1. Therefore vitamin B_1 should be regarded as a normal constituent of canine gastric juice.

Mr. Peter Black, also, read a paper on "The ketogenic principle of the anterior hypophysis." The injection of suitable pituitary extracts into 40-day old rats which are either fasted or fed a diet of extremely high fat content evokes striking ketonuria. Similar extracts of the posterior pituitary, or of brain, liver, or muscle, are inactive in these tests, as are adrenaline and thyroxine. The effect may be elicited in thyroidectomized, adrenalectomized, or hypophysectomized rats. The active principle is present not only in crude pituitary extracts but also in the purified thyreotrophic fraction, but it is not identical with the thyreotropic hormone, since it occurs also in growth-hormone fractions low in thyroid-stimulating activity. The growth hormone may be obtained free of ketogenic activity by the Evans' procedure of exposure to acetic acid, or by repeated adsorptions on calcium phosphate; the adrenotropic hormone is also free of ketogenic effect. Rats which have been treated over long periods with the thyreotropic fraction (containing the ketogenic principle) become immune, and fail to develop ketonuria when fasted and injected with potent extracts. The serum of such rats, or of similarly-treated horses, contains a substance which, when injected into previously-untreated young rats, renders them immune to ketogenic extracts in the usual method of testing. There is evidence that this "anti-hormone", like the "anti-thyreotropic substance", is not an antibody in the accepted sense of the word.

The Toronto Biochemical Society

The 31st meeting of this Society was held at the Medical School in London, Ont., on October 13, 1934. The following communications were presented.

"Insulin and peripheral carbohydrate metabolism", by N. B. Laughton and A. B. Macallum.—Previous researches have indicated that the fall in blood sugar following the administration of insulin results from increased utilization of carbohydrate in the tissues. More recent opinion favours the oxidation of sugar, rather than glycogen formation, as the important factor. The knowledge of the respiratory mechanism of the cell has been clarified in the last few years, and discrepancies in the intermediary metabolism of glucose have been eliminated in the last few months. This has resulted in yielding a scheme of cell respiration and glycolytic mechanism which forms the basis of our work. We have used respiratory inhibitors (narcotics and cyanides) and agents which retard intermediate stages in glycolysis (fluorides and iodoacetates) *in vitro* on living rabbits, noting the effects of maximum tolerated doses on animals given 1 rabbit unit of insulin per 2 kg. of animal. The blood sugar values formed the basis upon which our conclusions were based.

The hyperglycæmic action of narcotics, cyanides and iodoacetates is a matter of record, and we have found that fluorides have a like effect on the blood sugar. Our results indicate that the principal effect of insulin in the glycolytic cycle is at the stage where pyruvic acid reacts with glycerophosphoric acid to form lactic acid. The principal criticism to be met is that the hyperglycæmia is due to deglycogenation of the liver rather than the result of retardation of glycolysis in the tissues. We have found that the quantity of insulin used in our experiments will reduce deglycogenation hyperglycæmia to the point of insulin shock when the peripheral metabolism is intact, so that this factor is not an important consideration in interpreting our results.

"The production and action of insulin in infected animals", by E. T. Waters. — The amount of insulin (per unit weight of gland) extractable from the pancreas of an infected dog is less than that obtainable from the normal animal. This decrease in the insulin content of the pancreas is roughly proportional to the duration and severity of the infection. Following the hyperglycæmia resulting from an intravenous injection of glucose

a decrease in concentration of the inorganic phosphate of the blood occurs in the normal animal. These phosphate changes have been interpreted as a direct result of the secretion of insulin consequent upon the induced hyperglycæmia. It was hoped to utilize such data to determine the ability of the pancreas of an infected animal to secrete insulin. However, the fact that we were able to obtain in infected dogs a decrease in inorganic phosphate after an intravenous glucose injection, and obtained on subsequent injection of insulin a fall in blood sugar, but no accompanying changes in inorganic phosphate, leads us to the conclusion that such phosphate changes cannot be regarded as a criterion for the secretion of insulin by the pancreas of the animal receiving glucose intravenously.

"The chemical determination of carbon dioxide bound to hæmoglobin", by J. K. W. Ferguson.

"Chemical studies on the effect of heat on milk", by G. Adams.—When raw milk is acted upon by rennin a firm clot of insoluble calcium paracasein results. However, if the milk is heated prior to the rennin action the clot is flaky and does not set firmly. It is believed that some fixation of the calcium phosphate takes place during the process of heating. It has been demonstrated that there is a loss of 15 mg. per cent of total calcium and 6 mg. per cent of total phosphorus. No change was shown in the inorganic phosphorus. Filtration experiments demonstrated no change in the soluble calcium and phosphorus of milk after heating. It has been shown that the calcium phosphate of milk is all in the form of colloidal dicalcium phosphate, so that the above results may be explained by assuming the precipitation of crystalline dicalcium phosphate from the heating of the colloidal form.

"The ascorbic acid content of some Ontario fruits and vegetables", by E. W. McHenry and M. L. Graham.—The authors have studied the estimation of ascorbic acid in plant tissues, using the titration against phenolindophenol. To ensure accuracy at least two extractions of the tissue must be made. Several precautions to be observed in the titration are suggested. Modified procedures for coloured tissues are described. A partial report is made regarding a survey on ascorbic acid in fruits and vegetables on sale in retail stores in Toronto. Many common Ontario fruits (peas, peaches, etc.) are poor sources, while strawberries, raspberries and currants are excellent. Samples of Ontario lettuce were found to contain little ascorbic acid. The reaction, while apparently specific for vitamin C in raw fruits and vegetables, gave erroneous results for cooked cauliflower, string beans and spinach.

University Notes

University of Manitoba

The newly appointed President of the University, Sidney Smith, late Dean of the Law School, Dalhousie University, with Mrs. Smith and family, has arrived in Winnipeg. He was formally inducted into office on October 12th.

Dr. John A. Gunn has been appointed Professor of Surgery, succeeding Dr. B. J. Brandson. Graduating from the Manitoba Medical College in 1904, he was for a time Medical Superintendent of the Winnipeg General Hospital and then entered into partnership with the late Dr. R. J. Blanchard. During the Great War his record of service was so notable that he received the O.B.E. and the C.B. He has also been appointed Chief of Surgery in the Winnipeg General Hospital.

Dr. L. D. Collin, St. Boniface, has been appointed a member of the Board of Governors of the University, in succession to the late Dr. J. E. Lehmann.

The following changes in the Faculty of Medicine are also announced: Dr. G. I. Boyd, Assistant Professor of Anatomy, having accepted a position in Leeds University, is replaced by Dr. L. A. Sigurdson as Lecturer. Dr. A. Blondal is Lecturer in Obstetrics; Dr. Elinor Black is Demonstrator in Gynæcology. Dr. B. J. Brandson and Dr. Charles Hunter, who have, respectively, held the Chairs of Surgery and Medicine, are recommended to be, the one, Professor-Emeritus in Surgery, and the other, Professor-Emeritus in Medicine. Drs. E. L. Ross, D. L. Scott and C. H. A. Walton are appointed Demonstrators in Medicine, and H. J. T. Nylander, Demonstrator in Bacteriology. Dr. W. F. Abbott is appointed Lecturer in Gynæcology in place of Obstetrics. Dr. Bruce Chown and Dr. O. J. Day are appointed Lecturers in Pædiatrics. Dr. Jon Stefansson has resigned as Lecturer in Clinical Ophthalmology.

ROSS MITCHELL

McGill University

Announcement was made recently at McGill University of the resignation of Dr. S. Ernest Whitnall, chairman of the Department of Anatomy, to take up a new post as Professor of Anatomy at the University of Bristol, England.

Dr. Whitnall is Robert Reford Professor of Anatomy, and graduated from Oxford University in 1901 with a Bachelor of Arts degree, later receiving the degrees of M.A., M.D., and B.Ch., from the same university. He came to McGill in 1919, and has published several works on

anatomy during the fifteen years he has been in Canada.

Dr. Whitnall's resignation is the second one which has occurred in the department of anatomy within a year, Dr. John Beattie, Associate Professor of Anatomy, having resigned last December to become director of research for the Royal College of Surgeons, London, a position formerly held by Sir Arthur Keith.

While no appointment to the chairmanship of the Department of Anatomy at McGill University, made vacant by the resignation of Dr. Whitnall, has been made at the time of writing, announcement has been made by Dr. C. F. Martin, dean of the faculty of medicine, of the engagement of Dr. James S. Baxter, of Belfast, Ireland, as assistant to Dr. Whitnall.

Dr. Baxter is twenty-nine years of age, and a native of Dublin, Ireland. He was educated at St. Andrew's College, Dublin, and Queen's University, Belfast, from which he graduated in 1929 with the degrees of M.Sc., M.B., and B.Ch., remaining in the University as senior demonstrator in anatomy for three years after graduation. Last year Dr. Baxter was awarded the Rockefeller Travelling Scholarship, which he held at Johns Hopkins Medical School, Baltimore for a year, following which he returned to Belfast a short time prior to his appointment to McGill. He became a Fellow of the Royal College of Surgeons in Ireland in 1932. Dr. Baxter is particularly interested in embryology.

University of Toronto

Dr. Ray F. Farquharson has been appointed Assistant in Medicine and head of the Department of Therapeutics, succeeding Dr. R. D. Rudolf. Dr. Samuel Johnson is to be Associate in charge of Anæsthesia; Dr. N. E. McKinnon, Associate Professor of Hygiene and Epidemiology; Dr. W. F. McPhedran, Assistant Professor in Medicine and Clinical Medicine.

Registration in the Faculty of Medicine, for the session 1934-35, as as follows. First year, 140; second year, 169; third year, 144; fourth year, 127; fifth year, 131; sixth year, 112; diploma in public health, 12; Bachelor of Science (medicine), 4; diploma in radiology, 1; graduate students, 4; occasional students, 4. Total, 848.

However much science thou mayest acquire, thou are ignorant when there is no practice in thee. Neither deeply learned nor a scholar will a quadruped loaded with some books be; what information or knowledge does the silly beast possess, whether he is carrying a load of wood or of books?—*Maxim II* of the Sheik Sa'di of Shiraz.

Special Correspondence

The London Letter

(From our own Correspondent)

The month of October is always one of the busiest in the medical schools and teaching hospitals of London. The beginning of the winter session, with the maximum entry of students at this time, presidential addresses at the various medical and scientific societies as they start their winter meetings, and this year, it is alleged in the lay-press, a boom in Harley Street! Each medical school has much the same program: an inaugural address to the students, old and new, by some distinguished layman or member of the medical profession, followed by prize-giving, with a dinner, often on the same evening, for old students, and, for two days or more before or after the opening ceremonies proper, a concentrated "refresher" course for practitioners at the hospitals where they received their original training. There have been one or two special features of the ceremonies this year which deserve mention.

Lord Nuffield laid the foundation stone at Guy's Hospital of the new building for private patients, a development which is rapidly becoming a necessity at each teaching hospital. Actually it was fifty years ago that Guy's took the pioneer step of opening a twelve cubicle ward for private patients, the first of its kind in a general hospital. Another new development at the same hospital is the materialization of the third full-time clinical research unit, provided by the Medical Research Council, with Dr. Ronald Grant, an assistant to Sir Thomas Lewis at the first of such units at University College Hospital, as the director.

Another of London's great hospitals has also passed an important milestone in its history, for the gigantic rebuilding scheme at Middlesex Hospital, launched nearly ten years ago, has now reached its final stage, the whole of the money required—well over a million pounds—being now available, thanks to unparalleled generosity of certain individuals in the later stages.

The new Post-Graduate Medical School at Hammersmith is also advancing in its development, for all the professorships, with the necessary assistants, are now filled, and progress towards full working order in the next year is only marred by the unfortunate resignation of the dean on the grounds of ill-health, necessitating a new appointment to this key position.

Outside London there have been additional celebrations this year at Durham and at Manchester for in both instances centenaries have arrived. The University of Durham College of Medicine, in Newcastle-on-Tyne, was founded a hundred years ago, while in Manchester at the same time the first general meeting of the medical society was held on the first Wednesday of October, 1934.

Of the various lectures delivered in October, 1934, the most important included Lord Horder's presidential address to the Medical Society of London entitled "Medicine and morals", in which he made a striking plea that medicine should take a guiding part in many of the social problems of the day. The same spirit has already activated the Royal College of Physicians of London to study and approve the recent report on voluntary sterilization of the unfit. At the annual Harveian Oration before this College, on St. Luke's Day, Sir James Collier traced the progress of neurology through the achievements of some of its most famous practitioners. With all these new activities the new year in the medical world may be said to be well launched.

An important development in scientific research is contained in a recent report from the team of workers who have been investigating the influenza virus. Last year it was announced that the successful attack on distemper in dogs made possible largely because the ferret was found to be a susceptible laboratory animal had been followed by discovering a similar susceptibility in this animal to the strain of human influenza virus. Now comes the news that the mouse can be infected by introducing the virus into the nostrils, and at once this opens up great possibilities for widespread research upon an easily available laboratory animal. It appears that the lesions produced in the lungs in the mouse closely resemble those found in fatal human cases, and, farther, it has been possible to prepare from the horse an antiserum which has complete protective properties. While the advance is not as spectacular as the lay public desire—the recurring demand for more research into the cause of the common cold and of influenza having recently made its annual appearance—there is no doubt that from a scientific point of view the results obtained with the mouse may have far-reaching effects.

One of the weak spots in the modern developments regarding psychological disorders has been the difficulty of securing short-time appointments for graduates in the mental hospital services. It is now announced that at one mental hospital all the usual obligations and restrictions necessarily attached to a service have been swept away, in order that house physicians may be appointed for six or twelve months on similar terms to the common post-graduate appointments at maternity or children's hospitals. Here will be a great opportunity for those going into practice to acquire special knowledge of minor mental ailments, and the Hertfordshire County authorities are to be congratulated at making this step possible at their St. Albans institution.

ALAN MONCRIEFF.

121 Harley St.,
London, W.1.

The Edinburgh Letter

(From our own Correspondent)

It is interesting to record the recent installation of General Smuts as Rector of St. Andrew's University. In a rectorial address, characterized by its inspiring and thought-provoking qualities, the veteran warrior drew a vivid picture of the dangers which threaten freedom in the modern world, and issued a stirring call to youth to rally in defence of this ideal. He took his audience back into the past of Scotland, referring to the great Scots Parliament, which, assembled at Arbroath in 1320, declared in a manifesto to the Pope that they would "fight not for wealth, nor for glory, nor for honour, but for that freedom for which every good man would lay down his life". That fight he pictured as the great opportunity for the youth of today. As he developed his theme, his personality and the nature of his message stilled the interruptions and the boisterousness characteristic of such occasions. He described himself as a "hard-bitten campaigner, giving his message to the young". He drew a stark picture of the fear and insecurity among the nations, of the dark irrational forces of the past, once more stalking forward from their obscure background, and of the pessimism and despair which were abroad. He proceeded, however, to emphatically declare his belief in the goodness of the world. He pictured the triumphant advance of science in the generations ahead, and confidently foresaw the human soul surmounting its trials. His emphatic denial that the world was on the verge of another war drew the most wholehearted cheer from his audience.

Several important changes have occurred in the teaching staff of the Edinburgh school. Dr. James Young, one of the leading gynæcologists in Edinburgh, has been appointed Director of the gynæcological side of the British Post-Graduate Medical School in London. During the War he served in the R.A.M.C. with the rank of Lieut.-Colonel and was awarded the D.S.O. Dr. John Duncan White, who has been in charge of the Radiological Department at the Royal Infirmary, has been appointed Director of that Department in the London Post-Graduate School. Dr. Chalmers Watson has retired from the post of senior physician at the Royal Infirmary, after an association with that institution extending to almost forty years. Dr. Watson has devoted a great deal of study to the subject of nutrition, and for his research work in that connection he secured the Alvarenga Prize of the College of Physicians, Philadelphia. He has been a prominent advocate of reform in regard to the medical curriculum.

In Glasgow, Dr. Samuel J. Cameron has succeeded Prof. J. M. Munro Kerr in the Chair of Midwifery at the University. At the recent graduation ceremony in Glasgow, degrees in

medicine were conferred on over 100 students. The Vice-Chancellor the University, Principal Sir Robert Rait, presided and congratulated the students upon their success. Most of them, he said, had passed through the long and exacting training required from those whose mission it was to heal the sick. The progress of knowledge in our own time had added greatly to the burdens which fell upon the student of medicine. That, of course, was not in itself remarkable or peculiar to studies in medicine; it was the fate of the student of every living subject. But while the student of other subjects could select the regions which they studied there was a tendency for the layman to demand that his doctor should know everything about all of the ills to which flesh was heir. How far the examining body which guarded the gateway to the profession of medicine shared this expectation they as students had better opportunity of knowing than he had. They knew well that they did not pass from an exacting training to an easy life. He had spoken of what the layman expected from them, and they must not think the layman unreasonable. The public, deeply and painfully conscious that their bodies were mortal, trusted the medical profession. They trusted them not merely because they had nothing better in which to confide but because of the long and glorious tradition of the profession. Generation after generation had looked to the doctor for help, and to each generation the profession had given an increasing response —increasing in the power, not in the will, to heal, for the will to heal had always been present. The exercise of that will to heal made stern demands upon them. It included the continuance of their studies as opportunity might serve; it included the duty of keeping themselves fit in order that they might help others; it included unwearied patience and self-restraint, the power of inspiring hope, the sacrifice of ease and comfort. Those high hopes they would fulfil as the long line of those who had preceded them in the medical profession had done.

A party of medical men from the Irish Free State Government and from the Health Section of the League of Nations has recently visited the highlands and islands of Scotland to investigate the health services. The party, which was accompanied by Dr. Shearer of the Department of Health for Scotland and Dr. Mackenzie of the Health Section of the League of Nations, is on a study tour organized by the League. Their itinerary includes not only Scotland but France and Denmark. The conditions in the islands are similar to those in many parts of Ireland and elsewhere, and the Highlands and Islands Medical Service, to which I have referred in previous letters, is an excellent example of how medical assistance can be provided for an island population.

R. W. CRAIG.
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Topics of Current Interest

The Cod-Liver Oil Treatment of Wounds

Two years ago, at a surgical congress in Magdeburg, Prof. Wilhelm Löhr reported on the value of crude cod-liver oil in the healing of wounds. Applied to ulcers, burns, in fact any kind of abraded surface, followed by immobilization of the part with a plaster bandage, the results were then very striking, and his subsequent experience at the Altstadt Hospital has only been more remarkable. Before he came to Magdeburg Löhr was a biologist, and it was as a biologist that he was first impressed with the effect of cod-liver oil given internally on the healing of wounds in children. He began to apply the crude oil to granulating surfaces, and noted the changes which went on underneath it. He was already aware that, like other oils, cod-liver oil is practically sterile and has some bactericidal action on the common pyogenic organisms. The oil proving too mobile for use alone he combined it with some indifferent fat to make an application of the right consistence,[1] which was found rapidly to permeate granulation tissue forming an emulsion with its secretion. Under this layer he discovered that bacterial growth was hindered and bacterial toxins rendered harmless. The practical result of applying this cod-liver oil salve to a mass of granulations is to change a pale oozing surface covered with detritus into the clean ruddy picture of healing. Tremendous activity with massive secretion of pus soon leads to the shedding of dead tissue and sharp demarcation between the healthy and dead. So violent is this action that it may be inadvisable at this stage to shut it in with an impenetrable layer of plaster, although this should be done as soon as it is safe to do so. On the other hand, the comparatively bacteria-free wounds of industry, common enough in the iron industry at Magdeburg, can safely be covered at once with a layer of oil and immobilized in a plaster bandage, when in this warm chamber healing of the almost sterile wound proceeds at an amazing speed. Any part in which the circulation is relatively deficient, as in chronic ulcers of the leg, can be treated with the occlusive bandage at once. The time of its application is regulated by the acuteness of the infection. Phlegmons and abscesses must first be laid open with the knife; in whitlows and infections of tendon and bone the opportunity must first be given for removal of the dead fragments. But in recent injuries of the fingers and burns of the second degree the immediate application of the occlusive oil bandage results in rapid healing without need of transplantation of skin. During the last three and a

1. The salve has been put on the market by Heyl & Co. Berlin, under the name "Unguentolan".

half years in the Altstadt no burnt surface has been sown with transplants, even though the epithelium has been destroyed over a surface as large as the back, and one doubts whether such success has attended any other method. Amputation stumps and the open wounds left after removal of a breast cancer with the diathermic knife are equally suited for the treatment, which can also be applied to dirty brain wounds and accidental bed-sores.

An additional claim for the treatment is that it is practically painless, and anyone who accompanies Löhr on a round through the wards can satisfy himself that this is the case. On the other hand there is a drawback which he does not seek to evade, and that is the aroma arising from wounds on which the dressing is left unchanged for days or weeks. The smell will be not unfamiliar in kind, if not in degree, to those who have followed Winnett Orr, of Nebraska, in treating compound fractures and other septic wounds of bone with a similarly occlusive dressing.[2] This may be unavoidable if, as Löhr believes, the physical properties of an oil are an important element, but it must make medical and nursing work in such wards a trial for those with sensitive noses. Remarkable success is claimed in acute osteomyelitis, which Löhr treats with free incision down to the periosteum combined with drilling or chiselling of the bone. The whole wound is then filled up with the cod-liver oil salve, the edges being brought loosely together with two or three stitches. No drain of any kind is inserted, the oil serving to keep the wound open until it has healed from the bottom. The first plaster bandage is left on for a fortnight and as a rule no sequestrum is then found. It remains to be seen whether the results are better than those of the Winnett Orr method, of which painlessness is also a feature[3]; in the meantime they are such as to command respect and lead to imitation. Those who cannot see them for themselves will find a series of admirable pictures in recent published papers.[4]—*The Lancet*, 1934, **2**: 367.

2. *The Lancet*, 1933, **2**: 357.
3. *Ibid.*, 1934, **1**: 530.
4. Illustrating Burns: *Der Chirurg.*, 1934, **6**: 263. Injuries of hand and foot, *ibid.*, 1934, **6**: 5. Gas œdema, *Arch. f. klin. Chir.*, 1934, **179**: 312.

The Practitioner of the Future

Dr. James B. Herrick points out that whether a physician is to be successful depends in a measure on his native endowment and to some extent on chance. The possessor of knowledge, even though it is accurate and encyclopædic, is not necessarily a good practitioner. The reason may go back to the man's choice of a vocation. Some men are not medically-minded. There are those who think that success as a practitioner will come only if much time is devoted in undergraduate and later years to research. Medical research and practice differ in qualifications of workers, in objectives and in methods. The aim of research is to advance knowledge by discovery of the new. Practice is the application of knowledge already known. Every question of diagnosis is for the clinician a research problem. Unless the physician is inspired by the activating curiosity to know, to find out by close observation, by comparison with his own experience and that of others, by use of laboratory aids or by experiment, he is an inefficient practitioner, non-progressive and doomed to failure. Too implicit reliance on laboratory examinations may cause sound clinical judgment to shrivel up from disuse. Besides, unless there is extreme watchfulness, the laboratory may develop the impersonal in the doctor at the expense of the personal. The true physician must possess a dual personality, the scientific toward disease, the human and humane toward the patient. The physician learns by study; he becomes proficient by experience. He profits by his own mistakes and those of others. The patient is the most valuable text-book for the undergraduate student and the graduate doctor. The lower schools, universities and professional schools are seriously concerned with what is the best preparatory course for the doctor. How may fewer but better doctors be trained, If good and efficient service is rendered by the ordinary practitioner as an individual or as a member of a group there will be fewer quacks, fewer cults, fewer semi-charitable organizations, supported, or even run, by philanthropically-minded laymen or recalcitrant physicians. The graduate of today, while he may know relatively less than the doctor of fifty years ago is, absolutely, far better informed than his predecessor. The practitioner realizes that he must know still more. He is eager to learn. The hard work in the local society, in order to be more effective, should be done more by members and not so much by invited guests. The status of the practitioner will be determined largely by what he himself does rather than by what is done for him by others. What he gets out of practice will be in proportion to what he puts in. A result of this personal effort on the part of the doctor will be that he will become more self-confident, will lose some of his inferiority complex. His patients will sense this and go to him as of old for advice or for treatment. He will dare of himself to test a knee jerk, to assess at its real value a heart murmur, even to tell whether tonsils should come out or stay. He may possibly be so thorough as to make a rectal examination, and courageous enough to pass judgment on the results, thus depriving the consultant of one of his cherished prerogatives and most fruitful sources of income. Specialism and research are necessities and have come to stay. And so has

the practitioner; but only when, as, and if, he is qualified. There will surely develop in the future a competent practitioner, who, with integrity of character, with ideals of medicine as a profession and not a trade, with mind well stored with knowledge, with skill to apply this knowledge in a large proportion of cases of disease, with consciousness of his limitations, with readiness and ability to advise when and where expert help may be obtained, with good judgment and keen powers of observation sharpened by experience at the bedside and at the necropsy table, is worthy to be the family doctor or adviser, with all the traditional privileges and rewards that come from the personal relation of the old time doctor with the family—esteem and high standing in the community, the confidence and affection of his patient.—James B. Herrick in *J. Am. M. Ass.*, 1934, **103**: 881.

Winter Foes

In a few weeks, a great many houses will be hermetically closed for seven or even eight months. The double windows, too often preventing any entrance of outside air, will be carefully sealed against the cold. The only ventilation of the house will come from the doors, which must be opened, but as little as possible. Draughts which must be suffered during the hot months will be shunned as fatal. With such exaggerated precautions against cold it is not to be wondered at that fresh air, indispensable to health, does not circulate in the house, that the inside air, loaded with all the wastes of respiration and of domestic activity, cannot rid itself of its toxic products and renew its content of oxygen.

In winter the only foe that is feared is cold. But the too rigorous efforts made to avoid it give rise to other more powerful and detrimental enemies. Houses usually are overheated during winter and it is therefore necessary to maintain in them a constant renewal of the air. People dressed as if they were constantly to live in the open, suffer, in such houses, a loss of thermal equilibrium which cannot be compensated when they go out in the cold, and which may affect their health. Women dress more logically. In the house they wear light clothing, and when they go out they don heavy and warm coats which afford real protection.

There is a custom common in cities which may not be recommended to everyone but of which those who adopt it do not usually complain. This is the wearing, in winter as well as in summer, of light, sleeveless and legless underwear, so the body temperature will not be increased while indoors. When going out, they merely put on heavy overcoats, warm enough to protect them from the cold. The writer knows a family of four male adults who during the last three or four years have dressed lightly, as women do, wearing, both indoors and outdoors, light silken underwear, sleeveless undershirts, and legless drawers. Even during the last winter which was one of the severest in many decades they did not suffer any ill effects from the cold, except some lack of comfort. One of them who, some years ago, used to wear woollen underclothing with full sleeves and legs, suffered almost continuously from colds, but since he has begun to wear light clothing he has not had a single attack. Further, in their house, even during the severest cold, there are always one or two windows open.

This example is fairly convincing, although perhaps not a practice to be followed by everyone. It should at least suggest that men generally dress too warmly for our overheated dwellings, and that the difference between their body temperature, increased by the overheating of the house and the heavy clothing, and the outside temperature results in a shock when they go out in the cold, which is not felt by women with their reasonable indoors dress. Such shocks mean the weakening of resistance to chills. The conclusion therefore seems obvious that the greatest enemies of health in winter are the lack of ventilation, the overheating of houses, and too heavy and too warm underwear indoors.—*Sanitary Bulletin*, Board of Health, Que., 1934, **34**: 55.

Abstracts from Current Literature

Medicine

A Case of Hyperinsulinism without Demonstrable Pancreatic Changes in an Eleven Year Old Child. Boone, J. A., *New Eng. J. Med.*, 1934, **211**: 49.

The patient had had attacks of partial coma for four months. She fainted and could not be roused. Orange juice revived her. Her fasting blood sugar was 40 mg. per cent. Three sugar tolerance tests were done. The first one showed an increase in sugar tolerance, the other two were almost of the diabetic type. A fasting blood sugar estimation and the sugar from the spinal puncture, done simultaneously, were 56 and 34 respectively. On a starvation period the blood sugar went to 39 at 2 p.m., when she became difficult to rouse. Another starvation period produced no symptoms, though the blood sugar went as low as before. Another day she was given one gram of NH_4Cl every 2 hours, with no food; by 1.30 p.m. she could not be roused; her blood sugar was 36. There was apparently some relationship between the influence of NH_4Cl and the threshold of the patient's hypoglycæmic symptoms. She was operated upon, but no tumour was found. A small specimen

of the pancreas was removed at operation for examination. It showed an abundance of islets, but no definite abnormality.

LILLIAN A. CHASE

Renal Glycosuria mistaken for Diabetes. Lawrence, R. D. and McCance, R. A., *Brit. M. J.*, 1934, **1**: 981.

The authors find a number of cases of renal glycosuria still diagnosed as diabetes mellitus for one reason or another. Five cases are cited in particular, showing the difficulties which may arise if a low leak point is not considered in every case of glycosuria without typical diabetic symptoms. They point out, and this is shown in two of the cases quoted, that a normal person with previous carbohydrate starvation will give a diabetic type of curve. Hence, they advise that a full dietary be provided for some days before a diagnostic blood sugar curve be taken. The dangers of diagnosing and of treating diabetes without blood sugar control are well shown.

W. FORD CONNELL

Basophil Adenoma of the Pituitary Gland. Craig, J. and Cran, B., *Quart. J. Med.*, 1934, **3**: 57.

A case of basophil adenoma of the pituitary is described, diagnosed during life, and confirmed at autopsy. The patient was a woman of 28, with symptoms of four years' duration. She presented the characteristic features of the condition — rapidly acquired plethoric obesity, amenorrhœa, hirsuties, vascular hypertension, polycythæmia, marked striation of the abdomen, osteoporosis of the bones, curious pigmentation of the skin of the lower extremities and acrocyanosis. After diagnosis the case was treated with one series of deep x-ray applications. She returned six months later for a second series, and while in hospital developed pneumococcal empyema secondary to a purulent bronchitis. At autopsy the clinical diagnosis was confirmed by the finding of an adenoma in the anterior lobe of the pituitary, 0.6 by 0.5 c.m., made up wholly of basophil cells. The thyroid showed simple colloid enlargement. The adrenals were large, the cortex hypertrophied, and hæmorrhage was present in the medulla. There were marked venous congestion of all the organs, moderate arteriosclerosis, and left ventricular hypertrophy, as well as the septic process in the lung and pleural cavity.

It is pointed out that in the past such symptoms as this patient presented have been ascribed to adrenal tumours, it being thought impossible that such a small tumour as a basophil adenoma could produce such striking changes. But it is evident that the size of an endocrine tumour is no index of its activity in producing hormones. Further, it has long been known that a pituitary tumour could produce changes in the other endocrine organs, notably the thyroid and the adrenal, and Collip has shown experimentally that there are both thyrotropic and adrenotropic fractions in extracts of the anterior pituitary.

W. FORD CONNELL

Cirrhosis of the Liver and Splenomegaly in Three Brothers. Langmead, F., *Proc. Roy. Soc. Med.*, 1934, **27**: 939.

The mother of these three boys had been married twice. By the first marriage she had two sons and three daughters, all normal. By the second husband, she had five sons, three of whom showed cirrhosis of the liver and splenomegaly. They were the second, fourth and fifth in the family, and were aged 13, 11 and 9. The oldest was subject to hæmatemesis. All 3 showed normal fragility of the red blood cells, the size of the cells was normal; the van den Bergh, both direct and indirect, was normal. The urine in the two younger boys was normal, thought to be due to marked regenerative activity going on in the liver. All 3 showed anæmia, the oldest being the most affected, with red blood cells only 1,900,000 and hæmoglobin of 26 per cent. The others had red blood cells 5,400,000, hæmoglobin 80 per cent, and red blood cells 4,900,000, hæmoglobin 62 per cent. The colour index in all three was 0.7. The primary defect is thought to be in the spleen, not in the liver, although authorities differ as to the benefits derived from splenectomy.

MADGE THURLOW MACKLIN

Acholuric Family Jaundice in an Infant. Hawksley, J. C., *Proc. Roy. Soc. Med.*, 1934, **27**: 942.

The father and mother of this infant were normal. There were 5 children in the family, a boy of 9 and another of 5, both with acholuric jaundice, and a boy of 7 and a girl of 2, both normal. Knowing the family history, the author examined the new baby when it was two days old to see if it had inherited the defect present in the two older children. Even at that early date the red blood cells showed a narrower diameter than normal, being only 7.12 micra instead of 7.99 micra, the average width for infants of two days. The cells also showed the characteristic fragility at that time, hæmolysis beginning at 0.45 per cent saline instead of at 0.39 per cent, which is the normal figure at 2 days. At 10 days the red blood cells had still further narrowed to an average of 6.67 micra in place of the 8.16 micra characteristic of that age. Not until the child was five weeks old did it begin to show the pallor and jaundice which would have led to the diagnosis clinically. Thus the primary defect is in the red blood cell itself, inasmuch as its defects can be shown to occur before any clinical symptoms are in evidence.

MADGE THURLOW MACKLIN

Etiology and Symptoms of Neurocirculatory Asthenia. Craig, H. R. and White, P. D., *Arch. Int. Med.*, 1934, **53**: 633.

The term "neurocirculatory asthenia" is regarded as synonymous with "effort syndrome", "disordered action of the heart", and "soldier's heart". The authors have analyzed 100 cases, 50 without and 50 with organic heart disease. Eighty per cent showed the cardinal symptoms, palpitation, respiratory distress, precordial pains or aches, and fatigue. Functional gastrointestinal symptoms, headache, and dizziness were present in over 40 per cent. Increased perspiration, faintness, and insomnia were also common. Sighing respiration and precordial tenderness are regarded as confirmatory signs, and almost pathognomonic.

For comparison, 25 cases of neurasthenia, and 25 cases of psychoneurosis were studied. Neurocirculatory asthenia is to be distinguished from neurosis as such, in which anxiety, hypochondriasis or hysteria are predominant. It differs from neurasthenia, which disease is manifested primarily by lack of energy, easy mental and physical exhaustion, and irritability.

The authors emphasize the high incidence in civilian life, and classify the condition under three main groups: (1) that following severe infection, or operation, or prolonged fatiguing work, or illness, 19 per cent; (2) that following slight infection, or illness, or slight fatiguing work, 61 per cent; (3) that occurring after slight or no strain, but tending to be much aggravated by illness or fatigue, 20 per cent. The borderline between normal and the abnormal is ill defined, but is best indicated by the appearance of symptoms in the course of the usual physical activities and excitements of life, which previously gave no symptoms, or which in the average person would produce no symptoms.

LEYLAND J. ADAMS

Surgery

Factors Influencing Operative Mortality in Exophthalmic Goitre. Thompson, W. O., Taylor, S. G. and Meyer, K. A., *Ann. Int. Med.*, 1934, **8**: 350.

The two most important factors determining the risk of thyroidectomy for exophthalmic goitre are the pre-operative condition of the patient and the skill of the surgeon. The pre-operative condition of the patient can be improved as a rule by rest, by the administration of iodine, and a diet sufficiently high in calories to make the patient gain in weight. In gauging the patient's ability to withstand operation great attention should be paid to the degree of emotional instability present. Pre-operatively, the maximum improvement does not occur as soon as the basal rate has shown a maximum reduction, but only some time later, when the patient has had opportunity to benefit from the lower rate. Contrary to the generally accepted teaching, the basal rate will rise very little, in most cases, during the administration of iodine if operation is delayed for two or three weeks beyond the time of maximum reduction. If it does rise slightly it may be ignored in gauging the probable outcome of the operation.

In the few cases in which the metabolic rate rises rapidly in spite of the administration of iodine, and is associated with an increase in intensity of all the manifestations of the disease, it is usually safe to omit the iodine for a time. After a period of omission, the patient will usually respond to it again. The administration of enormous doses of iodine during the refractory period is of no more value than that of smaller doses. Iodine is given routinely after operation because enough thyroid tissue is frequently left to cause the disease to persist in a subdued form.

Thyroidectomy should be performed in at least two stages in all patients in whom there is any doubt about their ability to withstand the operation. Ligation of arteries does not appear to affect the intensity of the disease.

The indications for thyroidectomy are virtually the same, whether cardiac irregularities are present or not. Auricular fibrillation is common both before and after operation, and is, of itself, almost never a cause for alarm.

Tetany, when properly treated, is never fatal. Paralysis of the vocal cords is fairly common, its incidence being related to the skill of the surgeon. It rarely causes death, although it may delay recovery of a very sick patient.

The authors have reduced the operative mortality from 13 to about 4 per cent without any change in surgical personnel (or surgical technique). Thyroidectomies should, however, be relegated to a few surgeons who have developed good judgment, speed and gentleness, and not to general surgeons who have little opportunity to perfect the technique of thyroid surgery or to learn contraindications to operation.

H. GODFREY BIRD

Pericardiectomy for Advanced Pick's Disease. Flick, J. B. and Gibbon, J. H., Jr., *Arch. Surg.*, 1934, **29**: 126.

In concretio pericardii or callous pericarditis, commonly known as Pick's disease, the essential pathological change is a marked fibrous thickening of the pericardium, which limits the normal diastolic expansion of the heart. Intrapericardiac adhesions are almost invariably present. The symptoms are induced by the marked venous stasis and resemble those of chronic congestive heart failure. Removal of the pericardium is the only treatment. The authors report in detail the case history of a boy, twelve years of age, with advanced Pick's disease,

which was unsuccessfully treated by partial anterior pericardiectomy. The reason of the failure was attributed to a thickened calcified epicardium which was not removed at operation. The authors remark that "in a child, the history of recurring and persistent formation of ascitic fluid and dependent œdema, in the absence of obvious cardiac disease or of impairment of renal function, is highly suggestive of Pick's disease." Other significant findings are a low pulse pressure and a high venous pressure in the absence of valvular lesions of the heart; also the complete absence of any visible pulsation of the heart under the fluoroscope, as well as the absence of either visible or palpable pulsation over the precordium, in conjunction with the other visible findings, point to a markedly thickened pericardium. Some authors conclude that the underlying cause is a tuberculous pericarditis. In the present instance no such cause was determined.

G. E. LEARMONTH

Obstetrics and Gynæcology

Pyelitis in Pregnancy. Stander, H. J., *Am. J. Obst. & Gyn.*, 1934, **27**: 753.

There is a difference between the pyelitis of pregnancy and other forms of pyelitis. There is some degree of dilatation of the ureters during pregnancy, which makes it hazardous to come to conclusions about ureterograms made during pregnancy, unless the findings are very marked. Pyelitis is never "cured" during pregnancy, as shown by the urine cultures and the return to normal contour of the ureters. Only at three months can one accurately evaluate the status of an *ante-partum* pyelitis. Normal drainage of the ureters, normal contour and negative cultures indicate a cure. It is most important that in all cases of pyelitis we investigate the blood chemistry in order to rule out nitrogenous retention resulting from a pyelonephritis following the initial pyelitis. In a case of pyelitis which does not respond to rest in bed, forcing fluids, and alkali treatment, cystoscopy is indicated. Drainage of the kidney pelvis with irrigation, using 1-1,000 silver nitrate, will often relieve the condition. Cystoscopy has a definite place in the treatment of pyelitis during pregnancy.

ROSS MITCHELL

Menopausal Symptoms and Ovarian Function Following Hysterectomy. Tamis, A. B., *Am. J. Obst. & Gyn.*, 1934, **48**: 28.

The ovarian function of 18 hysterectomized women was determined by means of the extraction from the urine of œstrin (ovarian hormone) and Prolan A (anterior pituitary sex hormone). The presence of œstrin indicates ovarian follicular activity, while its absence and the persistent presence of Prolan A indicate ovarian follicular activity.

The duration of ovarian function did not bear any relation to the amount of gonadal tissue conserved. Ovarian activity persisted longer in the women under thirty-five years of age than in the older group. Conservation of the ovaries in the women under thirty-five years tended to retard the onset of the "flushes" to a greater degree than in the older group. In both groups, when the flushes did occur, they lasted longer than when they appeared in the bilaterally oöphorectomized women. Determination of the ovarian function pre-operatively in amenorrhœic cases where this activity is questionable may aid the surgeon in deciding beforehand the problem of ovarian conservation in the treatment of fibroids.

No direct relationship could be demonstrated between follicle hormone production and the onset and severity of the vasomotor disturbances of the menopause. Whatever influence the ovary exerts over these symptoms is due to some other mechanism. Evidence is presented from literature interpreted by others to indicate that the endometrium produced a hormone. Statistics have been quoted to show that the amount of flushing in hysterectomized women is proportional to the amount of endometrium excised. The suggestion is made that the gynæcologist not only attempt to conserve the ovaries when treating uterine fibroids, but also to save as much as possible of the uterine mucosa. This latter procedure is probably of greatest value to the patient in the prevention of menopausal symptoms.

ROSS MITCHELL

Cancer of the Cervical Stump following Subtotal Hysterectomy. von Graff, E., *Am. J. Obst. & Gyn.*, 1934, **18**: 28.

Stump cancer following subtotal hysterectomy is much more frequent than is generally recognized. Lacerations of the cervix and cervicitis following childbirth are unduly emphasized as initiating factors. Jewish women are protected by racial immunity against cancer of the cervix, a fact which may somewhat explain conflicting opinions as to the danger and frequency of stump cancer following subtotal hysterectomy. Cancer of the cervix is far more frequently found in fibroid uteri, and women with fibroids are therefore more likely to develop cancer in the stump. Methods used to prevent cancer by destroying the cervical mucosa have failed, as more than 80 per cent are squamous cell-epitheliomas of the vaginal portion of the cervix. The only safe protection against stump cancer is total hysterectomy, which should therefore be done routinely.

ROSS MITCHELL

Pathology and Experimental Medicine

The Rôle of the Liver in Hæmatopoiesis. Goldhamer, S. L., Isaacs, R. and Sturgis, C. C., *Am. J. M. Sc.*, 1934, **188**: 193.

These authors have injected intravenously into patients suffering from pernicious anæmia liver extracts prepared from other patients, dead from various diseases, in order to study the hæmatopoietic response. Their first experiment consisted in watching the reticulocyte response in a patient with pernicious anæmia after he had been given an extract of seven month human fetal liver. The result established the fact that this liver contained the hæmatopoietic stimulant. Their next two experiments consisted in administering to patients with pernicious anæmia liver extracts from other patients dead from the disease. The results showed that the liver of adequately treated cases contains the active principle, but is absent in the livers of inadequately treated cases. Their next experiments were similar in type, but the extracts were prepared from patients dead from liver disease, such as cirrhosis and acute yellow atrophy. In brief, they were able to show that damaged livers, as from cirrhosis, may not contain the active principle. They explain the occurrence of macrocytic anæmias in cirrhosis of the liver upon this basis. The liver of one case of acute yellow atrophy with a macrocytic anæmia was found to be rich in the active principle.

Their conclusions are that the active anti-anæmic principle elaborated in the stomach is not only stored in the liver but altered so as to be available to the tissues for utilization. The active principle in liver is therefore a storage product rather than an intrinsic part of the liver substance.

E. S. MILLS

The Relationship of the Intrinsic Factor to a Hæmatopoietic Material in Concentrated Human Gastric Juice. Helmer, O. M., Fouts, P. J. and Zerfas, L. G., *Am. J. M. Sc.*, 1934, **188**: 184.

The authors have been able to show that the material in human gastric juice, concentrated by vacuum distillation, which is hæmatopoietically active in pernicious anæmia, is not identical with the intrinsic factor. During the process of vacuum distillation the intrinsic factor is destroyed or used up, whereas during this process the active material in gastric juice is formed. When the ultra-filtrate of gastric juice is freed from pepsin, rennin and mucus by casein precipitation then vacuum distillation no longer produces a hæmatopoietically active material. This supports the hypothesis that the hæmatopoietically stimulating material in concentrated normal human gastric juice is not formed unless both an intrinsic and an extrinsic factor are present in the gastric juice during the process of concentration by vacuum distillation. Justification for this conclusion is further based upon the fact that ultra-filters hold back both the intrinsic factor and the material activated by vacuum distillation. The ultra-filtrate used was therefore free from both these substances in the beginning.

E. S. MILLS

The Effects of Bodily Rest, Muscular Activity, and Induced Pyrexia on the Ventricular Rate in Complete Heart Block. Gilchrist, A. R., *Quart. J. of Med.*, 1934, **3**: 381.

The author has made a detailed study of the auricular and ventricular rates in 11 cases of complete heart block, under varying conditions of rest, exercise and induced pyrexia. His group of cases, he divides broadly into "toxic" and "degenerative" varieties. In no case was fixity of ventricular rate found, even at rest. The correlation of auricular to ventricular rates was less fixed in the toxic than in the degenerative group, showing a more labile regulation of the independent rhythms in the former. Muscular exercise increased the ventricular rates in all the cases studied, the increase ranging from a minimum of 1.2 beats to 50.2 beats per minute. Obviously, the power to increase the ventricular rate in response to exertion varies greatly in different individuals and the time of recovery to the resting rate is similarly most variable, ranging from 1 to 5 minutes after the performance of fixed exercise. It was found that those cases which showed the greatest limitation of ventricular range, on exercise, showed the maximum lability of the auricle, and *vice versa*. Those cases showing the greatest ventricular range were the least incapacitated by their cardiac symptoms.

Fever was found to increase the rate of ventricular beating in all the cases of heart block studied; a rise of 1° F. in the course of protein-shock reaction may account for about four beats per minute increase in the ventricular rate. The findings suggest that there is no essential functional difference between the sino-auricular node and the idio-ventricular centre.

W. FORD CONNELL

Pædiatrics

Fate of Children of Tuberculous Families, including Those Treated and Those Not Treated with BCG. Kereszturi, C., Park, W. H., Vogel, P. and Levine, M., *Am. J. Dis. of Children*, 1934, **48**: 507.

This is a study of more than 1,000 children coming from homes in which some members of the families had tuberculosis. In all cases the tuberculin test, roentgenograms of the chest, and physical examination gave negative results before vaccination with BCG. The observations

were carefully controlled by the study of children coming from infected homes but who had not been vaccinated with BCG. During the period from December 15, 1926, to November 15, 1932, studies had been made on 435 vaccinated children and on 712 controls.

None of the children who were vaccinated subcutaneously or intradermally with BCG died of tuberculosis. Two (0.9 per cent) of those vaccinated orally died of tuberculosis. The lowest mortality due to tuberculosis among the controls (2.8 per cent) was shown by those who were known from birth and were matches for babies receiving BCG orally. The controls who were in most respects comparable with the infants receiving BCG parenterally, because they gave a negative reaction to tuberculin at the time they entered the group, showed a mortality from tuberculosis of 3.1 per cent. Those who had a positive Mantoux test at the beginning showed the highest mortality from tuberculosis (7.5 per cent). A detailed analysis of 795 children, all of whom were known from birth, and all of whom were exposed to open tuberculosis in their homes during the first year of life, indicates that the mortality from tuberculosis was 1.8 per cent in the case of the children receiving BCG and 9.7 per cent in the controls. Judging from the gross analysis of the total group, vaccination with BCG is not only harmless but apparently decreases the mortality due to tuberculosis.

JOHN NICHOLLS

Therapeutics

The Medicinal Treatment of Chorea (Calcium Aspirin). Mutch, N., *Brit. M. J.*, 1934, **2**: 246.

The author discusses the medicinal treatment of Sydenham's chorea in children, a disease which, apart from its cardiac complications, is rarely fatal. Various methods of therapy must accordingly be assessed in terms of their ability to lessen the duration or the severity of an attack. Without drug treatment the average duration of an attack may be taken as 6 to 10 weeks. The average for mild cases is about 35 days, for moderate cases, 46, and for severe cases, 67 days. The occasional case may drag on for many months.

Many remedies are listed as having been tried; only a few merit discussion. Nirvanol was first claimed as a specific for chorea in 1919. Treatment with this drug is drastic, being nearly always followed by disagreeable sequelæ in the shape of fever, rash, and constitutional disturbance; a number of deaths have been attributed to its use. It undoubtedly shortens the attack in a useful percentage of cases, but in the author's experience the biochemical reaction produced by the drug is much more impressive than its efficacy in controlling the chorea. Ketogenic diet has been said to produce improvement, but according to most recent reports is of no benefit whatever. Many progenetic methods have been advocated. Remarkable success has been claimed by several observers from the use of typhoid-paratyphoid vaccine to produce fever. This method is definitely a drastic one, leaving the patient weak and anæmic, and demanding a period of convalescence. A similar therapy would certainly be most desirable. The author believes he has found such a therapy in the use of calcium aspirin. There are three commonly recognized etiological factors — rheumatism, nervous strain, and calcium deficiency. This drug affords a means of dealing adequately with all three of these factors, making good the calcium deficit (recently demonstrated to be present in all cases of active chorea), while at the same time having a sedative effect on the brain and combating the rheumatic element. This drug has been known for a long time, but is only recently available in a stable form—calcium aspirin (Coplans). It dissolves readily in water, forming a neutral solution suitable for intravenous use. It is almost tasteless, and because of its neutrality is non-irritant to the stomach and bladder. Its solubility renders it quickly absorbable when given by the mouth or rectum. The author has used this drug in a series of 19 cases of Sydenham's chorea in children—5 mild, 11 moderate, and 3, severe. In addition, the patients were kept in bed, screened, if in a public ward, given a light mixed diet, and very careful attention was paid to the cleanliness of the gastrointestinal tract. The average amount of the drug used was 45 grains for a child of 12 years. The reported results are remarkably good. The average time taken to control all the cases was only 71 days, the limits ranging from 7 to 46 days. The drug diminished the discomfort of the patient at all stages of treatment and produced no mental depression such as is usual with chloretone and other hypnotics. There was no relapse in any case when the drug was withdrawn.

W. FORD CONNELL

Therapeutics with Hormones of the Ovary. Kaufman, C., *Proc. Royal Soc. Med.*, 1934, **27**: 850.

The author points out that endometrial proliferation during the first half of the normal cycle is caused by the ovarian follicular hormone, while the transformation to the secretion phase of the second half is caused by the hormone developed by the yellow corpus luteal substance. Growth of the ovary in childhood and puberty depends on the follicular hormone.

In the treatment of cases of ovarian hormonal affections, dosage is all important, and the author has found that for successful treatment colossal doses of extracts are required, according to present day standards. Using such doses,

he succeeded 18 months ago in producing menstruation in the castrated female. A number of interesting cases are cited. W. FORD CONNELL

Ephedrine and Pseudoephedrine in Asthma, Bronchial Asthma and Enuresis. Christopherson, J. B. and Broadbent, M., *Brit. M. J.*, 1934, **1**: 978.

The authors have compared the value of pseudoephedrine with that of ephedrine in the treatment of various conditions. They find that pseudoephedrine—a drug of considerably lower toxicity than ephedrine and with fewer "side effects" than that drug, even in larger doses—is valuable as a gentle bronchial sympathetic stimulant. It is sufficiently active to give relief in chronic cases of dyspnœa and wheezing. It is a useful prophylactic against the nocturnal dyspnœa of asthma and the dyspnœa of exertion in chronic bronchitis. It cannot take the place of ephedrine, still less that of adrenaline, in acute attacks of asthma. The doses of this drug are about double that of ephedrine, for equivalent effects.

The authors feel that ephedrine is of outstanding value in the treatment of nocturnal enuresis in children, and find that pseudoephedrine is also useful, though not possessing the efficiency of the former drug.

W. FORD CONNELL

On the Control of Obesity. Douthwaite, A. H., *Brit. M. J.*, 1934, **1**: 699.

The author deprecates two widespread fallacies in treatment—the wholesale exhibition of thyroid extract, even with perfect thyroid function, and the prescription of strenuous exercise to individuals already exhausted by the task of carrying too much fat.

The various evils of obesity are noted—the dangers of infections and the risks of major operations in stout persons, muscular and cardiac inefficiency, dulling of the mental processes, constipation, etc. In all cases, obesity is due either to excessive eating or to endocrine deficiency. Whether obesity be endocrine or alimentary, however, the treatment is almost entirely a matter of dieting, with the one exception of the fatness of myxœdema.

The whole principle of dietetic treatment is to give a diet of caloric value below that required for the optimum weight of the patient. The author presents several specimen dietaries, which do not require any elaborate calculation, and are moderately palatable. The great restriction occurs, of course, in the fats and carbohydrates.

The use of drugs such as dekrysil (dinitro-o-cresol) is not justified by the results obtained in the author's opinion, especially as these drugs are poisonous in doses only a little above those which are therapeutically effective.

W. FORD CONNELL

Radiology and Physiotherapy

A New Method for the Treatment of "Bleeding Nipple" by Radium Implantation. Cutler, M., *The Am. J. of Roentgenol.*, 1934, **31**: 819.

Because it is a rare event to discover duct carcinoma underlying the syndrome of bleeding nipple where no palpable tumour is made out in relation to the nipple, and because duct carcinoma very frequently occurs at the site of a previously existing duct papilloma, therefore the author believes that the treatment of the condition known as "bleeding nipple" provides a problem deserving very careful consideration. It is dangerous to allow to go untreated a breast which presents a serous or sero-hæmorrhagic discharge from the nipple where no tumour is palpable in the breast. Where the discharge is hæmorrhagic the safest plan is to excise the breast without fascia, muscles, or axillary glands. Localization of the lesion is difficult, even with the author's method of transillumination, for small papillomata may be missed, and local excision is for the same reason unsatisfactory, for it is difficult if not impossible to be sure that the area so excised includes all the diseased ducts, and there is also the possibility that duct carcinoma co-exists. Further, local excision must be followed promptly by more radical measures if carcinoma be found in the excised portion. In older women complete mastectomy is the undisputed choice, but in younger girls and women the use of interstitial irradiation is put forward. The treatment of "bleeding nipple" by external radiation has been tried without success, but by the Keynes method of interstitial irradiation, using removable needles of radium element, the area is sterilized if duct carcinoma is present, and by the massive exposure duct papillomata are destroyed and replaced by fibrous tissue. This method avoids removal of the breast, especially in young women, for a lesion which, although potentially cancerous, is still benign.

A. S. KIRKLAND

Clinical Observations on Carcinoma of the Uterine Cervix after Radiation Therapy. Schmitz, H., *The Am. J. of Roentgenol.*, 1934, **32**: 87.

Reporting 662 private cases of carcinoma of the female genitalia treated to the end of 1928, 80 per cent of these were located in the uterine cervix. Statistics prove that early localized carcinomas, adequately treated, have a five year curability rate of 80 to 90 per cent. The carcinoma of a high maturity is more radio-resistant and requires a high radiation tissue dose to undergo resolution. If the diameter of the growth is within 6 centimetres irradiation can destroy it. If the tumour is larger, it is doubtful if it may be completely arrested. The extent

of the growth at the first examination and immediate and adequate treatment definitely govern the prognosis and curability of carcinomas. Sixty-six, 42 per cent of the cases, appeared in the fifth and sixth decades. Carcinomas are much higher in frequency in multiparal and uniparal sterility; unigravidity and one-child sterility are mainly due to infections. To prevent carcinoma we must look for chronic infections and treat them adequately whenever found during post-partum examinations, during routine physical examinations, and during periodic health examinations.

A. S. KIRKLAND

Cholecystography with Tetraiodophenolphthalein by Mouth; Experience with Regard to Success and Untoward Reactions. Newell, R. R. and Leef, E., *Radiology,* 1934, **23**: 31.

This is a report of 1,257 cases in the last five years in which the Graham dye test has been given orally. In 1,000 of these the dye collected in the gall bladder in visible amounts. The technique is described. This method, due to its simplicity, is said to be equal in efficiency to the slightly more dependable intravenous method. The occurrence of reactions is definitely less by the intravenous method. Chills and vomiting (fortunately not frequent) seem to lessen the chance of visualization of the gall bladder. Reactions occur more frequently when the evening low fat meal is taken shortly before the administration of the dye. In this series 80 per cent of visualizations were realized. Reactions are frequent but not dangerous, and have little influence in the success of the test. In cases of failure to achieve visualization repeat the test in twenty-four hours. This second effort was successful in half the cases tried. The sight and smell of food does not cause emptying of the gall bladder.

A. S. KIRKLAND

Oto-Rhino-Laryngology

Nasal Ciliated Epithelium, with Special Reference to Infection and Treatment. Proetz, A. W., *J. Laryn. & Otol.,* 1934, **49**: 557.

The surface mechanism of the nasal mucosa, namely the mucous blanket and the cilia which propel it, is of importance as it constitutes the first-line defence against infection and mechanical irritation. The nasal mucosa also receives the full effect of all treatment directed against the deeper tissues. The author by means of moving pictures examined the action of cilia under different chemical and physical stimuli, such as it receives during the treatment of various nasal conditions. He found that cilia readily regenerated after operative removal of the surface epithelium of the maxillary sinus, and that there were living, actively functioning, cilia in the midst of the extreme hyperplasia and pus found in some cases of chronic maxillary sinusitis. On drying small areas of the ciliated epithelium it was found that ciliary activity completely ceased. Prompt moistening causes activity to be resumed at once the first time, but if the drying is repeated it is found that moistening again only produces sluggish movements. The optimum temperature for ciliary activity was found to be 30°C. At 7°C., and at 43°C. motion ceased altogether. Cilia that had stopped moving owing to the low temperature recovered their motility when warmed again, but the cilia that had been stopped by heat could not be revived. It was found that cilia ceased to move in sodium chloride solutions of 5 per cent and 0.3 per cent, and that they retained their activity best in a 0.9 per cent sodium chloride solution. Liquid petrolatum causes the streaming of the cilia to become feeble. Ciliary activity was stopped almost immediately by 5 and 10 per cent cocaine solutions, but a 2½ per cent solution had no effect on the cilia. A 1:1,000 solution of epinephrine stopped ciliary activity at once, while 1:5,000 and 1:10,000 solutions required twenty minutes. Mercurochrome in aqueous solution stopped the cilia moving in 13 minutes.

The author believes that the common cold is due to infection following on some derangement of the cilia and its mucous blanket, and that further work must be carried out on this subject before we shall be able to treat nasal conditions satisfactorily.

GUY H. FISK

The Action of Cilia and the Effect of Drugs on their Activity. Negus, V. E., *J. Laryng. & Otol.,* 1934, **49**: 571.

Chloretone in 0.5 per cent solution causes paralysis of the cilia of the nasal mucosa. However, as used in atomizer for nasal conditions, it rarely reaches this concentration. Glycerine in 5 or 10 per cent solutions has a retarding effect upon ciliary activity. Protargol in 1 per cent solution has no harmful effect on cilia. Chloroform produces slight slowing of the cilia, but ether does not affect them at all, when given as an anæsthetic. Acid solutions paralyze the cilia. The mineral acids have much less effect than the fatty acids, as the former are unable to penetrate the blanket of mucus which covers the cilia, and they are unable to enter the epithelial cells. Alkaline solutions, when dilute, quicken the activity of the cilia. At a pH of 6.4 or less all ciliary activity ceases. In many cases of purulent sinusitus the pH of the pus is below 6.0, which suggests that this factor may be of importance in connection with that disease. All these factors must be considered, as well as the physical changes in the process of infection which occurs most commonly during the common cold.

GUY H. FISK

Anæsthesia

Cyclopropane Anæsthesia. Waters, R. M. and Schmidt, E. R., *J. Am. M. Ass.*, 1934, **103**: 975.

This paper represents the results of a twelve months' clinical study of cyclopropane, including over 2,000 clinical administrations, in comparison with those obtained from the administration of ethylene and ethyl ether. The method employed, with certain exceptions, was that of the carbon dioxide absorption technique, permitting the utmost economy in the use of a rather expensive gas. Cyclopropane is capable of producing narcosis in concentrations as low as 4 per cent, administered along with oxygen. The average concentration of cyclopropane for first plane, third stage anæsthesia (roving eyeball) was 7.4 per cent; second plane (fixed eyeball) 13.1 per cent, and third plane (with intercostal paralysis) 23.3 per cent. Respiratory arrest was produced with an average concentration of 42. 9 per cent. Pre-medication consisted of morphia, gr. ⅛ to ¼, and scopolamine, gr. 1/200 to 1/100, administered hypodermically one and one-half hour before induction. The technique of administration of cyclopropane consists of introducing it into the breathing bag, previously filled with oxygen, at the rate of 600 to 700 c.c. per minute, and continuing at this rate for from thirty seconds to three minutes. It is then stopped and the carbon dioxide absorption technique, with constant replenishment of oxygen, is employed.

The physical signs are in the main the same as for ether anæsthesia. Clinical laboratory studies show that cyclopropane has a minimum deleterious effect upon the metabolic processes of the body. The electrocardiographic changes occurring under cyclopropane anæsthesia are no more evident than changes occurring during a corresponding degree of narcosis with other commonly used agents. The post-operative complications following cyclopropane administration compare extremely favourably with ethylene and ether. However, it should be noted that tachycardia, a severe drop in blood pressure, or shock, occur more frequently after cyclopropane than after other agents. Recovery is more frequently accompanied by nausea than following nitrous oxide or ethylene, so that nitrous oxide is still to be recommended for minor operations of short duration. In conclusion, the authors state that after a year's study of its possible usefulness they find cyclopropane replacing ethylene to the satisfaction of all concerned, and that it is to be chosen in preference to ether in well over 75 per cent of the work formerly done under that agent. It also is to be preferred to nitrous oxide as a means of inducing ether anæsthesia. A comparative analysis of post-operative complications leads one to expect better results following the use of cyclopropane in patients handicapped by respiratory and circulatory abnormalities.

ARTHUR WILKINSON

Hygiene and Public Health

Mercury-Laden Air: The Toxic Concentration, the Proportion Absorbed and the Urinary Excretion. Fraser, A. M., Melville, K. I. and Stehle, R. L., *J. Ind. Hygiene*, 1934, **16**: 77.

In this paper the authors set out the results of their investigations to determine the permissible concentration of mercury in air. Dogs were used as experimental animals. A cabinet was constructed in which the degree of ventilation, the temperature, and the concentration of mercury could be regulated. A number of observations were made. Briefly, it was found that with concentrations below 1.89 mg. of mercury per litre of air no toxic signs were evident after 40 days' exposure (eight hours each day). When the concentration was increased toxic signs began to appear. Thus at 3 to 4 mg. per litre gingivitis, diarrhœa, loss of appetite, and loss of weight occurred. At a concentration of 6 mg. per litre one dog died on the 38th day and another on the 39th day. At a concentration of 20 mg. per litre one dog died on the 1st day and another on the 3rd day with dyspnœa and weakness.

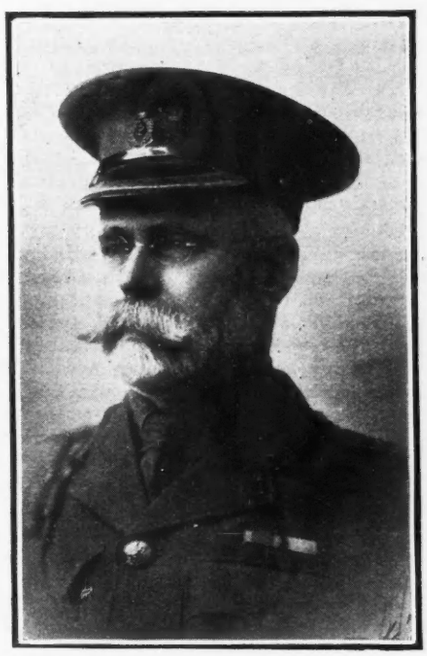
Serial examinations of the excretion of mercury in the urine revealed the interesting finding that no constant relationship existed between the degree of intoxication and the excretion of the mercury. For example, in the case of one dog, the amount of mercury excreted in the urine on the 6th day of exposure to mercury vapour (3.05 mg. per cu. metre of air) was 0.395 mg.; on the following day it was only 0.067 mg. On the 22nd, 23rd and 24th days of exposure, although the animal was suffering from quite severe mercurialism, only traces of mercury could be recovered from the urine. Single daily specimens of urine may convey a most misleading picture.

Observations were made in an attempt to determine the proportion of mercury retained when different concentrations of the vapour were inhaled. In the experiments the dog breathed air containing a known concentration of mercury and exhaled the air into a Douglas bag, the contents of which were measured. In determinations using concentrations of mercury varying from 26.18 mg. per litre of air to 2.91 mg. per litre the results expressed in per cent of inhaled mercury absorbed were surprisingly constant, varying from 21 to 26 per cent. That is to say, in these experiments approximately 75 per cent of the mercury inhaled was recovered in the exhaled air, indicating an absorption of only 25 per cent.

F. G. PEDLEY

Obituaries

Dr. William Webster. The dean of western Canadian anæsthetists, Dr. William Webster, died on October 23rd at the Winnipeg General Hospital as a result of inhaling gas fumes while extinguishing a fire in his cabin cruiser. Born on August 24, 1865, in Manchester, he came to Manitoba in the '90's, taught school in Winnipeg, and graduated from Manitoba Medical College in 1895. He began as a general practitioner, but soon became the first specialist in anæsthesia west of the great lakes. Possessing iron nerve, a keen mechanical sense, and a passion for research, he had the ideal temperament for an anæsthetist. In 1902 he became anæsthetist to the Winnipeg General Hospital, a post held to the day of his death, save for a break of four years of war service. In 1920 he



William Webster

became vice-president of the Canadian Society of Anæsthetists and in 1922 president of that body. Two years later his book "The Science and Art of Anæsthesia", C. V. Mosby Co., St. Louis, appeared.

Because Dr. Webster had taken active part in the Canadian Militia before 1914 it was no surprise when at the outbreak of the war he was given command of No. 4 Canadian Field Ambulance. In France his fearlessness under fire, and his capacity for administration won him the Distinguished Service Order. Later, he was commanding officer of the Convalescent Hospital at Uxbridge, then of No. 12 Canadian Hospital at Bramshott, and finally D.M.S. of Military District No. 10 at Winnipeg. He was a crack revolver shot, one of the earliest motorists in Winnipeg and first president of the Winnipeg Automobile Club, but his real hobby was his motor launch in which he spent his holidays touring Lake Winnipeg.

His writings included his book and a number of papers on various phases of anæsthesia contributed to the *British Medical Journal, Surgery, Gynæcology and Obstetrics*, the *American Journal of Surgery*, the *Canada Lancet*, and the Transactions of the British Association for the Advancement of Science. His greatest contribution to medicine, however, was his ability to teach the generation of medical students who came under his instruction at the Winnipeg General Hospital from 1902 to 1934, not only the A.B.C. of anæsthesia but to instil in them something of his own imperturbability, his constant watchfulness, and his resource. In 1919 his ability was recognized by promotion to be Associate Professor of Surgery (Anæsthetics) in the Faculty of Medicine of the University of Manitoba.

His widow, two sons and a daughter survive him.

ROSS MITCHELL

APPRECIATIONS

The recent tragic death of Dr. William Webster brings before the older members of the profession in Winnipeg vivid memories of his student days and early life in this city. He had a most unusual capacity for scientific work, even as a student, and very soon after graduating in 1895 he was appointed pathologist to the Winnipeg General Hospital. Shortly afterwards, he became a partner of the late Dr. Neilson, and carried on a large general practice with him until the latter's death in 1904. For almost forty years as pathologist, as a member of the attending staff, and as chief anæsthetist, he maintained the most intimate and cordial relations with the Board of the General Hospital. This record of loyal service to one institution, is without a parallel in the medical annals of this province.

In addition to his purely professional gifts and activities he had a quality and range of versatility that distinguished him and contributed largely to his unique personality. As a sportsman, as a soldier, as a writer, he achieved distinction—even preëminence. As a man, words cannot picture the rare qualities of his mind and heart. He was, in word and deed, a gentleman.

In 1924 he published what was practically a text-book on the subject: "The Science and Art of Anæsthesia", and in 1925 a second volume entitled "Anæsthesia for Nurses". He contributed also numerous articles dealing largely with anæsthetics, from 1908 until 1927, and the columns of some of the leading medical journals were always open for his publications.

In 1921 he was elected president of the International Association of Anæsthetists, and in 1922 the Canadian Association of Anæsthetists did him the honour of electing him to the presidency of that organization.

E. W. MONTGOMERY

It is no exaggeration to say that Dr. Webster put the scientific administration of anæsthesia on the map in western Canada. The first in the west to make anæsthesia a specialty, he prepared himself not only by careful study but by original research. His text-book on anæsthesia testifies eloquently to a thorough and comprehensive knowledge of every phase of the subject. There are surgeons in Winnipeg who recall the anxiety over the anæsthetic which often harassed them before Webster rescued this feature of their operations from the realm of the haphazard and uncertain, playing his part with such consummate skill that the surgeon could forget everything but his own work. Not only was he a master of his art, but such an exceptionally capable and inspiring teacher that pupils who were attracted to him now occupy responsible positions in many operating rooms.

He will be greatly missed, not alone because of the excellence of his special work but also because of certain qualities of mind and character. Only his intimate friends ever learned how richly his mind was stored with miscellaneous knowledge, and what an amazing memory he possessed for figures and details. Fearlessness, rugged honesty, cheerfulness and a philosophic attitude toward the bitter as well as the pleasant experiences of life were features which endeared him to those who were privileged to know him well.

H. P. H. GALLOWAY

Dr. Milne Brownlee, of Woodstock, Ont., died at his residence on October 8, 1934, in his 84th year. He was a graduate of the medical faculty of Trinity University (1880) and an L.R.C.P.(Lond.).

Dr. Francis James Albro Cochran, of Toronto, died at his home in Toronto on October 23, 1934, in his 70th year. He was a graduate of Bellevue Hospital Medical College, N.Y., (1892). He formerly belonged to Halifax, N.S.

Dr. William Rupert Esdale, of Ottawa, died on October 17, 1934. He was one of the most prominent of the younger physicians of Ottawa, and had been ill since September 29th, growing steadily worse. A native of Ottawa, a son of William Esdale, Dr. Esdale was educated at Toronto and McGill Universities, graduating from the latter in medicine in 1926, and took post-graduate work in the Women's Hospital, New York, and the New York Polyclinic Hospital. He began practice in Ottawa in 1929, specializing in obstetrics, and was obstetrician at Grace Hospital. He was a Captain in the Canadian Army Medical Corps, attached to the Third Divisional Signals. Surviving are his parents, Mr. and Mrs. William Esdale of Ottawa; his widow, formerly Miss Estelle Hurd, a native of South Carolina, and one daughter, Gaynell.

Dr. Hugh MacKay. After a prolonged illness Dr. Hugh MacKay, of Winnipeg, died at his home on October 12th in his seventieth year. He was born at Embro, Ont., graduated in medicine from the Manitoba Medical College in 1895, and practised for some years at Carberry before removing to Winnipeg. He was one of the first practitioners of the city to employ radium as a therapeutic agent, and his knowledge of skin diseases caused him to be appointed Professor of Dermatology. He was a member of the honorary staff of the Winnipeg General Hospital and a member of St. Stephen's-Broadway United Church. He is survived by his widow and one son. Dr. James A. MacKay, of Vancouver, is a brother. Dr. MacKay was a man of much kindness of heart and integrity of life.

Dr. Duncan Neil Maclennan, of Toronto, an eye specialist, for more than 30 years prominent in medical circles in Toronto, died on October 19, 1934, at his home. Born at Port Hope, he was a son of the late Donald Maclennan, and graduated from Queen's University (1891). He took post-graduate work in London, England, for nine years and took the degrees M.R.C.S. and L.R.C.P. (1896). He was house surgeon at the Royal Ophthalmic Hospital, Moorfields, and chief medical officer at the Ear and Throat Hospital, Golden Square, London, Eng. He returned to Toronto 30 years ago and established a practice on Bloor Street West. Surviving are his wife, formerly Miss Marion Clemesha, daughter of Dr. Clemesha, of Port Hope; and three brothers, James and Alexander Maclennan, Toronto, and Donald Maclennan, Montreal.

Dr. James McWilliam, one of the oldest physicians in Toronto, died at his home, in North Toronto, on October 11, 1934, in his eighty-second year.

Dr. McWilliam for some fifty years was widely known in Grey county, and until eight years ago practised at Dundalk. Since then he had been located in Toronto.

The late Dr. McWilliam was born near Hespeler, and received his early education in the Galt preparatory schools. Graduating from Trinity Medical College (1876), he immediately located in Grey county. He is survived by one son, James B. McWilliam, of Toronto, and a daughter, Mrs. Duncan McAllister, of Dundalk.

Dr. Frank Vanderlip, of Brampton, Ont., died suddenly on October 20, 1934. He was born in St. Catharines in 1880, the son of the late Edwin and Jane Vanderlip. He graduated in medicine from University of Toronto in 1905 and took over the practice of Dr. Bowles at Woodhill. Dr. Vanderlip came to Brampton in 1917 and later became the medical officer of health for the municipality and the county jail physician. Two brothers died within the last five years, leaving him the last of his family. He is survived by his widow, formerly Miss Mary Burton.

News Items

Great Britain

The William Gibson Research Scholarship for Medical Women.—Miss Maud Margaret Gibson has placed in the hands of the Royal Society of Medicine a sum of money sufficient to provide a Scholarship of the yearly value of £292 in memory of her father, the late Mr. William Gibson, of Melbourne, Australia. The Scholarship is awarded from time to time by the Society to qualified medical women who are subjects of the British Empire, and is tenable for a period of two years, but may in special circumstance be extended to a third year. The next award will be made in June, 1935.

In choosing a Scholar the Society will be guided in its choice "either by research work already done by her, or by research work which she contemplates. The Scholar shall be free to travel at her own will for the purpose of the research she has undertaken". There is no competitive examination, nor need a thesis or other work for publication or otherwise be submitted. The Society has power at any time to terminate the grant if it has reason to be dissatisfied with the work or conduct of the Scholar.

Applications should be accompanied by a statement of professional training, degrees or diplomas, and of appointments, together with a schedule of the proposed research. Applications must be accompanied by testimonials, one as to academical or professional status, and one as to general character. Envelopes containing applications, etc., should be marked on the top left-hand corner "William Gibson Research Scholarship", and should be addressed to Mr. G. R. Edwards, Secretary, Royal Society of Medicine, 1, Wimpole Street, London, W.1., and be received not later than Saturday, June 1, 1935.

Alberta

Nominations are being called for the representatives on the Council of the College of Physicians and Surgeons, for the following districts—Lethbridge No. 2, Camrose No. 4, and Calgary No. 6. The elections are to take place in December. In order that the Council may be near the profession whom they represent elections are held every year, for two-year terms. Elections in the even numbered districts occur in the even years and the odd numbered districts in the odd years.

The Council Committee on the revision of fees sent to all the members of the profession a suggested list, with the request that each individual assist in arranging a schedule of fees which would be fair and reasonable, alike to the people and to the profession. It is thus felt that when adopted it should represent the best thought in the profession and in case of court action there would be no hesitancy on the part of the Court to accept it.

At the Annual Meeting of the Alberta Hospital Association the following resolution was passed:—

"Resolved that this Association request the Provincial Department of Health to discuss with the College of Physicians and Surgeons of Alberta regulations looking toward the improvement of the conditions under which major surgical procedure may be carried out in the hospitals of this Province."

This will be taken up with the Council of the College of Physicians and Surgeons at its next meeting in a few weeks. G. E. LEARMONTH

British Columbia

The usual autumnal rise in the incidence of poliomyelitis has been observed in the past two months. There does not appear to have been anything approaching an epidemic, although this possibly may be attributed to the vigilance of the local health officers. A sporadic case or two has occurred in the vicinity of Vancouver, and a larger number in the Kootenay and Okanagan valleys. Schools were closed in Nelson and Kelowna and children prohibited from any public assemblage. At the time of writing these bans have been lifted.

Much publicity has been given to the appearance in the southern parts of the province recently of *Lactrodectus mactans*, better known as the "Black Widow" or "Shoe-button Spider". This animal, widely known as one of the most venomous spiders in North America, is probably not a recent immigrant to British Columbia, but has appeared in greater numbers, like many other species of spider, after an unusually warm and dry autumn. The shiny black bulbous body with characteristic orange-coloured "hour-glass" marking on the abdomen enables it to be readily identified. No deaths have been reported from the bite, but it is of much interest to learn from a report of 29 cases recently reported in the *American Journal of Medical Sciences* by Walsh and Morgan that very severe pain and rigidity in the abdominal and other large muscular masses, coming on about an hour after the bite, is a constant symptom. D. E. H. CLEVELAND

New Brunswick

On November 2nd, Dr. J. S. McEachern, President of the Canadian Medical Association, and Dr. T. C. Routley, General Secretary of the Canadian Medical Association, addressed a very large meeting in Saint John, composed of physicians in that vicinity representing the New Brunswick Medical Association. These gentlemen presented a summary of medical conditions across Canada, and proposed plans for closer organization between the Canadian Medical Association and the various provincial medical societies. The chief point in this organization, as presented, was that each medical society should be designated as the provincial branch of the Canadian Medical Association, rather than that each provincial society should be affiliated with the Canadian Medical Association as at present. The speakers also addressed the gathering on the advantages and disadvantages of state medicine in Canada, without any concrete plan being put forward. The addresses were discussed freely and at great length, and a motion was finally passed that the whole matter be referred to the Executive of the New Brunswick Medical Association for careful study and report to the next meeting of the provincial society.

Visits from the senior officers of the Canadian Medical Association such as these should have a very definite advantage to the profession in Canada at large as well as to the national association. We were all very glad to meet the president and secretary, and hope that this scheme of Canada-wide visits will be continued.

On November 3rd, the same gentlemen were entertained at Moncton at a luncheon arranged for by the Moncton Medical Society. At both these meetings the number of out-of-town physicians was remarked upon. Dr. Routley stated in Saint John that the meeting on November 3rd was the 1,581st medical meeting which he had attended in the last sixteen years.

At the annual meeting of the American College of Surgeons held in Boston recently a large delegation attended from New Brunswick. Drs. R. T. Hayes, O. B. Evans, of Saint John, and Joseph W. Dobson, of Moncton, received the degree of F.A.C.S. at this meeting.

Dr. Thomas Nugent, recently intern at St. Joseph's Hospital, Saint John, has passed the examination of the Medical Council of Canada, and is now practising in Riverside, Albert County.

Drs. J. M. Barry and Joseph Tanzman, acting as a delegation from the New Brunswick Medical Association, appeared at the meeting of the New Brunswick Union of Municipalities to press the claims of the medical practitioners for payment for their services to indigents. As a result of their efforts a resolution was passed recommending such a procedure to the various municipalities.

Dr. Robert A. Gregory has been appointed medical assistant at the Provincial Hospital for the Insane at Lancaster. Dr. Gregory is a graduate of McGill, a licentiate of the Medical Council of Canada, and has lately spent two years in the Massachusetts General Hospital, where he specialized in diseases of the nervous system.

The Saint John Medical Society tendered a complimentary dinner to Dr. Wm. J. Baxter, of Fairville, and presented him with an engraved silver tray in anticipation of his marriage which took place on November 6th.

A. S. KIRKLAND

Nova Scotia

Dr. J. S. McEachern, President of the Canadian Medical Association, accompanied by Dr. T. C. Routley, paid a visit to Nova Scotia a few days ago. This visit was a continuation of their tour throughout Canada to address the various medical societies in the interest of closer cooperation and more effective organization among the different provincial medical societies. On November 5th, they addressed a well-attended meeting of the Halifax Medical Society. Among those present was Hon. Dr. F. R. Davies, Minister of Health for the Province.

Before leaving Halifax, Dr. McEachern also gave an address before the Nova Scotia Society for Mental Hygiene on the subject "Physical and mental health". At the same meeting Professor Glen gave a review of the progress made in the study of mental hygiene. It is of interest to note that this Society now enters upon its tenth year, and that with every succeeding year it becomes more active. Dr. S. H. Prince was again elected President.

At the annual meeting of the Eastern Counties Medical Association, held at Antigonish, several Halifax physicians attended. Drs. G. R. Burns and E. K. Maclellan read papers, and Drs. H. G. Grant and P. S. Campbell were also present.

Dr. J. I. O'Connell, a native of Sydney and a graduate of Dalhousie University, now practising in Newfoundland, was hurt in a motor accident recently. While attending to repairs on his car he was struck by a motor bus and suffered several bruises.

Dr. Francis J. A. Cochrane, a native of Nova Scotia, and for thirty years a practitioner in this province, passed away at Toronto at the age of 69. He was a graduate of Bellevue Hospital. Before entering practice he took a post-graduate course in Guy's Hospital, London.

The report of Dr. S. H. Martin, of the American Medical Association, on "Hospital Standardization" states that 15 provincial hospitals are on the approved list, while 5 are provisionally approved. These 5 have accepted the minimum requirements. Lack of time and other acceptable reasons have hampered them in carrying out all details.

A reunion of the Class of 1911 of Dalhousie Medical School took place on November 4th at the home of Dr. H. W. Schwartz. Eight of the class are still resident in Halifax after a lapse of twenty-three years.

N. B. DREYER

Ontario

Dr. B. T. McGhie, Deputy Minister of Hospitals for Ontario, has announced that psychiatric hospitals or units are to be established at Kingston and Hamilton.

A special committee to report on slum conditions in the City of Toronto was appointed last March by the Board of Control, with His Honour, the Lieutenant-Governor of the Province of Ontario, Dr. Herbert A. Bruce, as Chairman. The Committee has presented results of a detailed survey which should be of great value. Among their recommendations are the following: (1) immediate establishment of a City Planning Commission; (2) a campaign to eliminate as soon as possible existing unfit houses; (3) the initiation at once by the city of extensive projects for the demolition of slum areas and the provision of low-cost houses; (4) a move by the city to secure necessary cooperation from the Federal and Provincial Governments.

It is of interest to note that a private hospital has been constructed at Callander for the Dionne quintuplets. It has been built through contributions of well-wishers all over the world. Although small, the hospital is said to be perfect in its appointments.

It is reported that the Government of the Province of Ontario has awarded $25.00 to each of the midwives who assisted Dr. Dafoe at the confinement of Mrs. Dionne of Callander.

Following the action of the Alma Mater Society in depriving twenty-four medical students of "the right to participate in all students' athletic and social activities for a period of not less than one academic year", because of their holding membership in a Greek letter society with foreign affiliations, the University authorities at Queen's have passed a resolution which would appear to effectually ban from Queen's University all Greek letter fraternities with foreign affiliations.

The many friends of Dr. Donald C. Balfour, of the Mayo Clinic, will be delighted to learn that he has been honoured by election to the Presidency of the American College of Surgeons at its recent meeting in Boston.

Dr. J. H. Mullin, of Hamilton, has been appointed Chief Coroner for the City of Hamilton.

Lieutenant-Colonel W. G. Thompson, of Hamilton, has been named Honorary Director of Dental Services for the Province of Ontario.

The fifth Annual Meeting of the Royal College of Physicians and Surgeons of Canada was held in the National Research Building, Ottawa, on October 29th, with the President, Dr. Duncan Graham, of Toronto, in the Chair.

J. H. ELLIOTT

The new officers for the Ontario Hospital Association are: *President*, Dr. D. M. Robertson, Ottawa; *President-elect*, Rev. Father Verreault, Ottawa; *Vice-presidents*, Dr. W. Dobbie, Weston, and Dr. J. H. Holbrook, Hamilton. Dr. F. W. Routley, of Toronto, was reappointed *Secretary-treasurer* and Miss P. Austin was appointed to the Board of Directors, in place of Miss H. Meiklejohn.

Manitoba

The report of the Health Department of the City of Winnipeg for the years 1932 and 1933 makes out a strong case for the existence of a Health Department. There is evidence of considerable saving of life, especially in infancy and from infectious diseases, in the case of the latter accompanied by actual saving of the taxpayers' money. That the intensive child hygiene and communicable disease prevention work carried on by Winnipeg organizations has had a most beneficial effect upon the children and youth of the city is shown by the following figures.

	1920	1925	1933
Total deaths under 20 years of age:	1,054	538	290

The combined saving for 1933, as compared with 1920, for the Municipal Hospitals' controllable expenditure and Health Department expenditures, amounts to $238,-920. It is, of course, impossible to estimate the actual amount of money saved by citizens through the reduced amount of sickness indicated by the lower mortality shown in the table above.

The infant mortality rate per 1,000 births shows a decrease from 206.6 in 1912 to 45.4 in 1933. The typhoid fever mortality rates per 100,000 population show a decrease from 248.3 in 1904 to 1.8 in 1933.

The crude mortality rates per 100,000 population for the leading causes of death, 1915-1933, are of interest. Communicable and infectious diseases have all decreased: tuberculosis of lungs from 79.2 to 27.4, other forms of tuberculosis from 16.8 to 4.6; meningitis from 17.3 to 4.6; pneumonia, all forms, from 91.1 to 44.8; acute and chronic bronchitis from 21.8 to 4.6; puerperal deaths from 12.9 to 5.9. On the other hand degenerative diseases have increased: cancer, all forms, from 48.5 in 1915 to 136.3 in 1933; cerebral hæmorrhage from 20.8 to 49.9; diseases of the heart from 59.9 to 152.4; acute and chronic nephritis, appendicitis, and external causes show only slight variations during this period.

Maternal mortality gave crude rates of 3.4 per 1,000 live births in 1933 and 6.1 in 1932, and corrected rates (excluding non-residents) of 3.3 in 1933 and 5.7 in 1932.

Seventy-five per cent of the milk consumed in Winnipeg is pasteurized. The dairy inspector believes that the pasteurized milk in Winnipeg will compare favourably with that of any community, and finds it difficult to understand why some consumers continue to patronize the vendor of low grade raw milk which is of poor quality and not too safe. Milk consumption remains at about two-thirds of a pint per capita daily, which compares favourably with other cities on this continent.

Due to present economic conditions, there has been considerable "doubling up" of families and the illegal conversion of houses designed for one family into tenements. In the face of this the present low incidence of communicable diseases is a matter for congratulation.

ROSS MITCHELL

Saskatchewan

The seventh convention of the Saskatchewan Health Officials' Association was held in Regina on October 10, 1934. Dr. R. G. Ferguson, Director of Medical Services and Superintendent of the Saskatchewan Anti-Tuberculosis League, delivered the president's address. The subject of "Inspection of meat" was ably introduced by Dr. W. H. Orme, Saskatoon, and Dr. J. E. Leblond, Moose Jaw, under the chairmanship of Dr. Arthur Wilson. Dr. J. S. Fulton, Saskatoon, and Dr. C. Rose, Simpson, lead an instructive discussion on the subject of "Contagious abortion and undulant fever". Miss Ruby Simpson, of Regina, presided as chairman, when Miss Ruth Morrison, of Prince Albert, and Miss M. Morton, of Weyburn, gave inspiring addresses on "Public health nursing services".

At the luncheon the delegates were favoured with a most interesting talk by Hon. Dr. J. M. Uhrich, Minister of Public Health. The speaker of the afternoon session was Dr. R. O. Davidson, Deputy Minister of Public Health. Dr. E. M. Vesey, Canora, and Dr. J. G. K. Lindsay, Lumsden, led the discussion on "The many problems of the part-time Medical Health Officers". The subject of "Problems of the City Medical Health Officer", was discussed by Dr. B. M. Bayly, Moose Jaw, and Dr. H. C. Burroughs, Swift Current. Mr. J. Martin, Regina, and Mr. T. Douglas, Weyburn, spoke on the "Problems of the Sanitation Officer".

A recommendation approving the principle of generalized public health nursing, and urging that the government increase the staff of eleven nurses to cover the province was adopted.

The following were elected officers for 1934-35: *Patrons* — Lieutenant-Governor Munroe, Hon. J. G. Gardiner, Hon. J. M. Uhrich, Minister of Public Health, Dr. R. O. Davidson, Deputy Minister of Public Health; *President*—Dr. T. A. Patrick, Yorkton; *Vice-president*—Dr. W. H. Orme, Saskatoon; *Sec.-treas.*, R. H. Murray, Regina; *Executive*—Miss Anne Morton, Weyburn, Miss Ruth Morrison, Prince Albert, Dr. C. Rose, Simpson, Dr. J. G. Lindsay, Lumsden, H. Jamieson, Swift Current, and F. Cartlidge, Moose Jaw. *Educational Committee*—Dr. Wilson, Saskatoon, Dr. Riley, Regina, Miss Ruby Simpson, **Regina.**

The Convention of the Saskatchewan Hospital Association was held in Regina on October 13th. The morning session was addressed by L. Gowdy, Saskatoon, when he stressed the policy of watching each purchase and keeping complete records, this being the only way in which the greatest economy could be achieved. W. H. Madden, of the Saskatchewan Sanatoria staff, led the discussion.

When the convention adjourned at noon the delegates went to the Regina General Hospital, where they were guests at luncheon. Ald. E. B. McInnis, Regina, chairman of the hospital board, briefly addressed them and invited them to inspect the departments of the hospital. Guides were provided to show the delegates about the building. A demonstration of operating room technique was an interesting feature of this tour.

Miss D. Wilson, of the Regina General Hospital staff, opened the afternoon session, with an address on admitting-office procedure. Discussion of this subject was led by J. S. Williams, Moose Jaw General Hospital. The work of the women's auxiliaries was ably outlined by Mrs. W. Van Valkenburg, Regina. Miss I. McGillivray, Saskatoon City Hospital, gave an illustrated address on "The hospital care of children". The Association decided to ask the provincial government to make efforts to reduce the interest rates on hospital debentures to a maximum of 4½ per cent per annum. The government will also be asked to consider ways and means of enabling small hospitals in drouth areas to continue to provide hospital services to patients who lack funds. Amendments to the various municipal acts will be sought to guarantee payment of accounts in communicable diseases cases to the hospitals within 60 days after discharge of the patient.

The concluding event of the convention was a dinner, which was addressed by Dr. R. G. Ferguson, superintendent of Saskatchewan Sanatoria, on "Tuberculosis among the Indians". The mortality from tuberculosis was about twenty times as great among the Indians in Saskatchewan as in the white population. He attributed this to the fact that the Indians had no inherited resistance to the disease to compare with that found in white people. Extensive surveys had shown that the incidence of active tuberculosis among Indian school children in western Canada was more than ten times that found among the white children in surrounding districts. Dr. Ferguson told of the formation of the Qu'Appelle Indian Health Unit, in which anti-tuberculosis measures had been applied since 1930, with a resultant reduction in the tuberculosis death rate. He said that although about 10 per cent of tuberculosis infection in white people was of the bovine type, none of this had been found among the Indians who drink little cow's milk. Research had been conducted among the Qu'Appelle Valley Indians since 1926 in connection with prevention and control of the disease. Dr. A. B. Simes was employed as full time medical superintendent of the Qu'Appelle Indian Health Unit. He said the halfbreeds appeared to have inherited some resistance to the disease, although their record was not so good as that of the whites. Improved living conditions were important in controlling tuberculosis among the Indians. He saw hope for the future in the fact that the death rate was only one-tenth of what it had been forty years ago.

Joseph Needham, of Unity, Sask., was elected *President* of the Association, with Dr. R. G. Ferguson as *President-elect*. The other officers are: *Hon. President*, Hon. J. M. Uhrich, Minister of Public Health; *First Vice-president*, L. Gowdy, Saskatoon; *Second Vice-president*, A. W. Nichols, Indian Head; *Secretary-treasurer*, G. E. Patterson, Regina; *Executive Committee*, S. T. Martin, Regina; Sister Clotilde, Moose Jaw, and T. Bervon, Hendon.

LILLIAN A. CHASE

United States

The Lilly Research Laboratories.—More than a thousand investigators and research workers were present at the formal opening of the new Lilly Research Laboratories at Indianapolis on October 11th.

At the formal exercises in the afternoon, Mr. Eli Lilly, head of the Lilly organization, presided. Mr. J. K. Lilly, chairman of the board of directors, was introduced and spoke briefly on "Research in manufacturing pharmacy" from the time of his entrance in the organization in 1876 up to the present. Following Mr. Lilly's remarks, Dr. Irving Langmuir, director of research for the General Electric Company, discussed "The unpredictable results of research".

The chairman then introduced Sir Frederick Banting, who talked on "The early history of insulin". He gave an account of the early experiments conducted by Dr. Best and himself, which first demonstrated the existence of insulin, and expressed his great appreciation of the cooperation which he and his associates had received from the staff of the Lilly Research Laboratories in the development of a practical, large-scale procedure for the production of insulin.

Sir Henry Dale, Director of the National Institute for Medical Research, London, and secretary of the Royal Society, was the last speaker on the afternoon program. He chose as his topic "Chemical ideas in medicine and biology". Sir Henry spoke of the immediate objectives of research in such laboratories as those of Eli Lilly and Company, and of their natural and proper differences from those of the laboratories supported by academic or public endowment. It was

his thought, however, that the differences in result for the progress of medical science were often more formal than real.

According to Sir Henry, the change that has taken place in the scope of pharmacy has a revolutionary aspect. He cited the fact that pharmacy not very many years ago was predominantly concerned with the traditional drugs that had come into use through empirical observation. Even though with the years had come new additions from time to time, the therapeutic outlook and attitude had changed but little for centuries. He pointed out that a beginning had been made by pharmacology toward rationalizing the use of those drugs in common use which had an action sufficiently definite to be susceptible to experimental analysis.

The speaker expressed the thought that, looking at the change as a whole, one might distinguish two main contributory factors. The first of these was the recognition of infections as due to the invasion of the body by living microörganisms. It is a commonplace that preventive medicine was born of this discovery, that it gave a new direction to the therapeutics of infective diseases, in the search for remedies specifically killing or limiting the growth of the infecting microorganisms or specifically neutralizing the poisons which they produce in the infected body. A few of the older remedies, indeed, according to the speaker, owed their value to an unconscious application of such specific actions for the control of infective organisms which modern research has since identified—cinchona, ipecacuanha, mercury, and the iodides. Contrast with this the resources of modern therapeutics, with its range of antitoxins and bacterial products, and its growing list of new synthetic compounds discovered as the result of deliberate and organized search for substances which shall be harmless to the infected patient in doses which kill or prevent the multiplication of the infecting organism. A new and exact chemical basis for these mysterious phenomena of immunity is even now being built. We might properly class synthetic substances with the antitoxins and other antibacterial substances, as artificial and natural agents for the removal from the body of harmful invaders from without.

A second principal factor in this change in therapeutic outlook might be found in the recognition of diseases due to the lack of substances normally present in the body. Modern therapeutics can show no triumphs more brilliant than those which have followed the discovery of methods of preparing a number of glandular products in a state of sufficient purity to enable them, by artificial administration, to correct an abnormal deficiency. There was also the class of specifically acting substances, necessary like the hormones for healthy function and growth, but obtained by the body mainly from the food, and known to all the world as "vitamins".

It would be possible, Sir Henry said, to regard this remarkable change in therapeutic outlook and method simply as one phase in the general scientific development which has transformed a whole range of human activities in a generation. He felt that if we look for a particular rather than a general cause, we shall find it in the rapidity with which chemical knowledge and ideas have in this same period permeated the whole of medical and biological science.

The newer developments have but little relation to the art of the individual pharmacist whom our fathers knew, the speaker said, but we must resign ourselves, as in other spheres of human activity, to the loss of the individual art in exchange for scientifically organized production. In fact, he continued, in order to meet these novel, various, and expanding demands of modern therapeutics, pharmacy has to become one of the most highly organized departments of scientific manufacture, covering an extraordinary range of expert knowledge and equipment. He cited, in addition, a much more fundamental requirement, calling particular attention to the need for research undertaken in the spirit of free inquiry, often with no immediate practical aim or any probable result other than the increase of fundamental knowledge.

In the evening a banquet was tendered the out-of-town guests. Mr. J. K. Lilly served as toastmaster, and responses were made by Sir Henry Dale; Dr. Elliott P. Joslin, of Boston; Dr. George R. Minot, of Boston; Dr. Frank R. Lillie, of Chicago; Dr. George H. Whipple, of Rochester, N.Y.; Dr. Carl Voegtlin, of Washington, D.C.; and Dr. G. H. A. Clowes, head of the Lilly Research Laboratories.

The Nobel Prize in Medicine.—It was recently announced that the Nobel Prize in Medicine for 1934 has been awarded to Drs. George R. Minot and William P. Murphy, of Boston, and Dr. George H. Whipple, of Rochester, N.Y., for their notable researches on anæmia. Their discovery that liver and liver extracts could be used clinically for the treatment of anæmia, and, indeed, were practically specific in the case of pernicious anæmia, a disease which previously was regarded as almost hopeless in its outlook, marks a distinct and notable addition to the armamentarium of the physician. All will, we believe, agree that this distinguished award could not have been better bestowed.

Tribute to Dr. Cushing.—A life-sized relief in bronze of Dr. Harvey Cushing, formerly Moseley Professor of Surgery at Harvard University, was presented to the Medical School in November by a group of pupils, friends and associates. A bronze medallion in reduction of the original is available for those who wish a memento. The original medallion has been purchased by the Boston Museum of Fine Arts. Both the medallion and the bronze relief are the work of Paul Adrian Brodeur, Wellesley Hills. Dr. Cushing is at present Sterling Professor of Neurology at Yale University School of Medicine, New Haven.

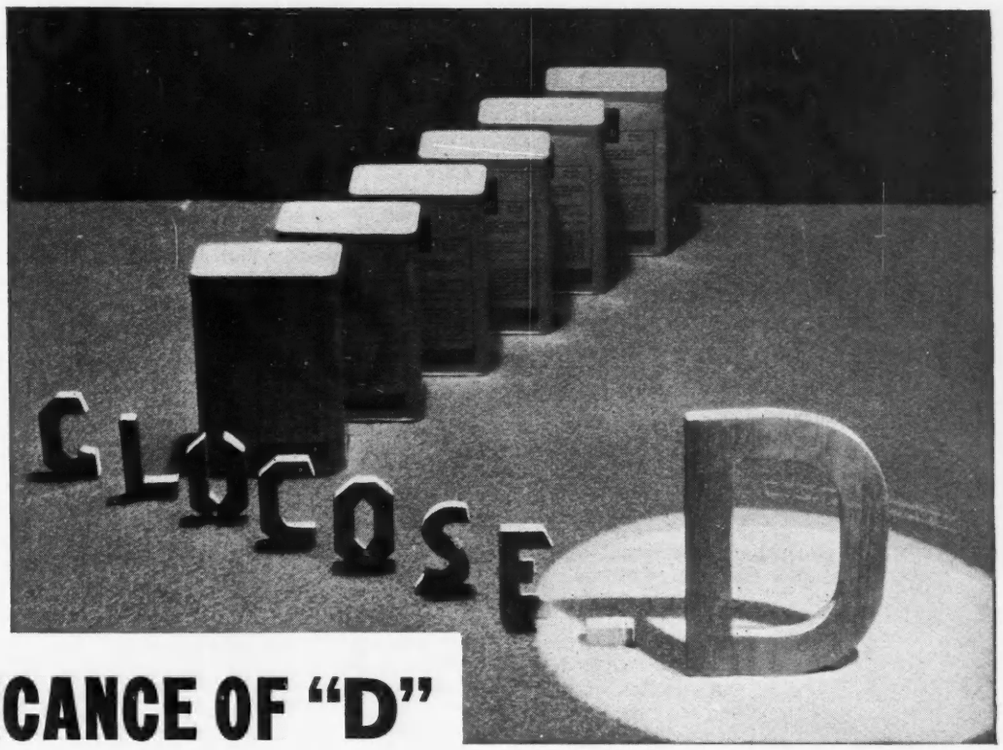
The American Association for the Study of Goitre again offers the Van Meter Prize Award of $300, and two honourable mentions for the best essays on the subject of goitre, provided they meet the standards of the award committee. The essays should be based on original research work on the subject of goitre, preferably its basic cause. The prize essay, or its abridgement, is to be presented at the annual meeting of the Association to be held in Salt Lake City, Utah, in June, 1935.

Competing manuscripts should be in the hands of the Corresponding Secretary, W. Blair Mosser, M.D., Kane, Pa., not later than April 1, 1935.

The first prize of $300 for the 1934 meeting was awarded to M. A. B. Brazier, Ph.D., B.Sc., London, England, for her essay "The impedance angle test for thyrotoxicosis". First honourable mention was awarded Prof. Ugo Cerletti, Genoa, Italy, for his essay "Three years of experimental research in the etiology of endemic goitre". Second honourable mention was D. Roy McCullagh, M.D., Cleveland Clinic, Cleveland, Ohio, for his essay "Studies in blood iodine, using a new chemical method".

General

The Second International Neurological Congress.—Plans for the Second International Neurological Congress, to be held in London from July 29 to August 2, 1935, are now well under way. Four topics have been chosen for consideration. The Epilepsies, the Physiology and Pathology of the Cerebrospinal Fluid, the Functions of the Frontal Lobe, and the Hypothalamus, and the Central Representation of the Autonomic System will be presented at the morning sessions; the afternoon sessions will be devoted to discussion on miscellaneous topics. Any recognized neurologist or



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psychiatrist may submit titles for presentation at the miscellaneous sessions, which titles, accompanied by brief abstracts, must be submitted to the Canadian Committee before January 15, 1935. Those accepted will be forwarded to the Secretary General in London for final consideration. Maximum time for presentation will be 10 minutes.

Candidates for membership may apply through the Secretary of the Canadian National Committee. The fee for Active Members is the equivalent of 25 Swiss francs ($5.00) for each participant in the Congress. The fee for Associate Members is one-half of the fee for Active Members. Requests for application blanks and submission of titles should be made as soon as practicable.

Thos. Cook and Sons are the official travel agents of the Congress, and arrangements for travelling and hotel accommodation may be made through them.

The Canadian Committee are Dr. Colin Russel, Chairman, and Dr. William V. Cone, Secretary. Dr. Cone's address is 3801 University Street, Montreal.

The Seventh International Congress on Industrial Accidents and Diseases will take place in Brussels, July, 1935. The program includes consideration of "The delayed effects of injuries to the cranium"; "Traumatisms of the hands and fingers"; "The prevention and control of industrial dusts"; "Initial and periodic physical examination of workers in dangerous dusts"; "The effect of gases in coal mines"; "The objective manifestations of pain"; "Pathological conditions due to electricity". Experts from Great Britain, the United States, and Europe will discuss these subjects in some detail.

The Congress offers a prize of one thousand Swiss francs as an award to the author of the best (unpublished) original work on the subject "The importance of previous physical condition in estimating the sequelæ of an industrial accident". Physicians in all countries are permitted to take part. Manuscripts must be in by December 31, 1934. The award will be made at the time of the Meeting of the Seventh International Congress.

Correspondence regarding the program or the preparation of manuscripts may be addressed direct to Dr. L. Dejardin, General Secretary of the Seventh International Congress on Industrial Accidents and Diseases, 23, Rue du Commerce, Brussels, Belgium, or to Dr. J. G. Cunningham, Ontario Department of Health, Toronto.

Book Reviews

Annals of the Pickett-Thomson Research Laboratory. David Thomson and Robert Thomson. Volumes 9 (1933) and 10 (1934). Monograph XVI. Influenza. Part 1, pp. 1-640, illustrated. Price $12.50. Part 2, pp. 641-1557. Price $17.50. Baillière, Tindall & Cox, London; Williams & Wilkins Co., Baltimore, Md.

The two latest volumes of the Annals of the Pickett-Thomson Research Laboratory are entitled "Influenza". Like their predecessors they represent a remarkable summary of the literature of this subject, whereby a fair idea of the contents of every paper can be usefully estimated. The "references to literature" (pages 1376-1477, Volume 9, covering 4,500 original papers) are so complete that there must be very few omissions, even of unimportant papers; for this alone every bacteriologist must be deeply grateful, while those engaged in research can gain the unique advantage of being saved the trouble of rediscovering old observations. This, undeniably, constitutes the chief value of these monographs.

The authors incline to the belief that "the prime initial cause of influenza", is a virus, and that Pfeiffer's bacillus, pneumococci, and streptococci, *et cetera*, "are important secondary invaders, influencing and determining the severity of the disease". They suggest, however, that there is the possibility of symbiotic infection being important, and that Pfeiffer's bacillus plays a definite part in the infection. So the question is raised as to whether the disease is due to a single specific agent or to a complex symbiotic infection.

The authors' studies of the literature lead them to believe that no other infectious disease shows such a wide variety of complications and sequelæ, many of which are distressing and debilitating, and, besides exercising an unfavourable effect on pre-existing diseases, there is also evidence of it increasing a predisposition to attack by certain infections. Special stress is laid on the unfavourable effect of influenza on surgical conditions and the advisability of postponing every non-important surgical operation during influenza epidemics.

This very remarkable review of the literature reveals no treatment beyond that known to our forbears. Put the patient warmly to bed, keep the bowels open, encourage perspiration, free fluids (hot) and "stimulants should be given, not at the beginning, but towards the end of the attack, and more especially during convalescence".

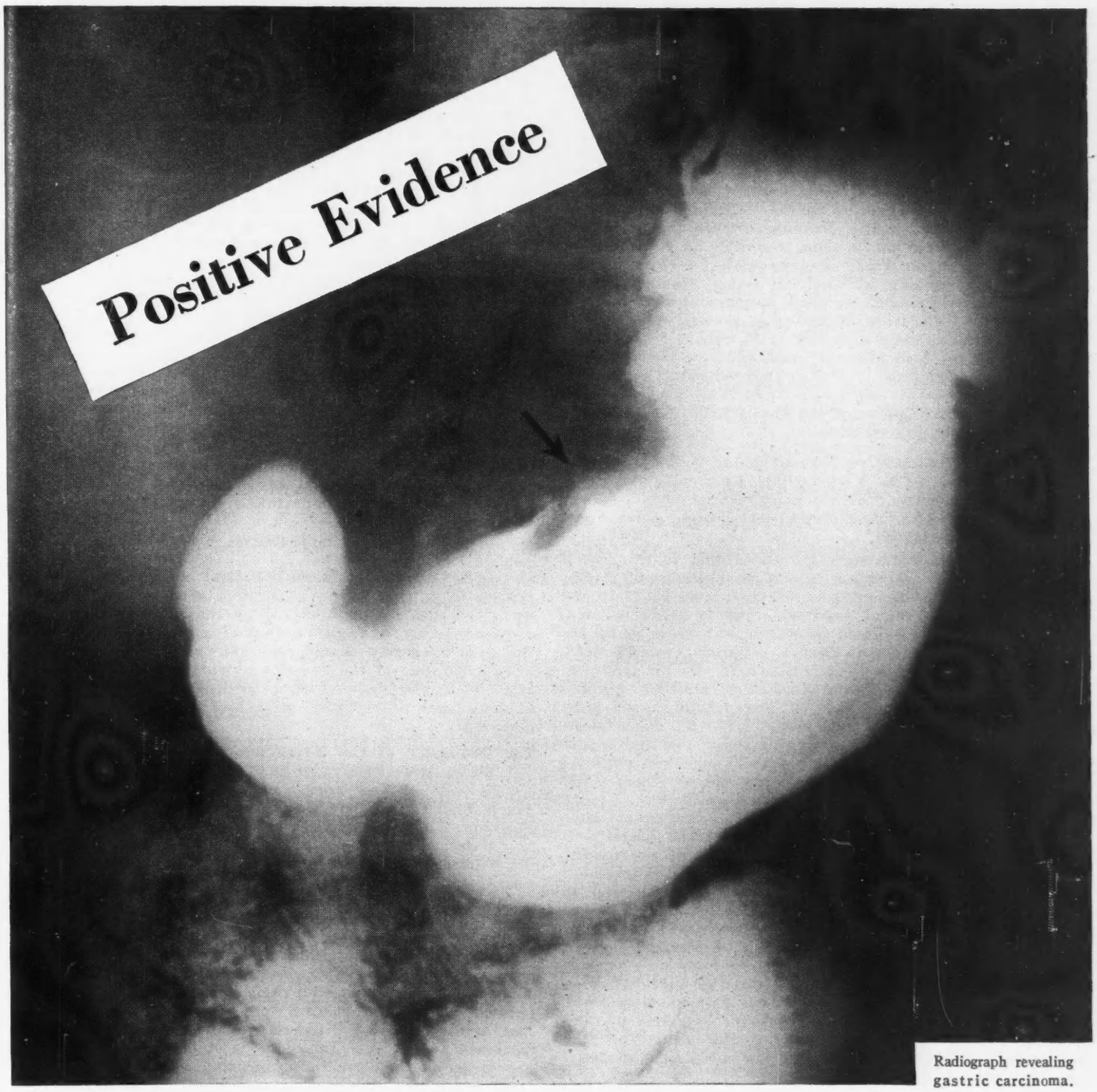
The volumes are well indexed, which greatly adds to their value as works of reference. The photographs used as illustrations, for which Dr. David Thomson is responsible, are indeed remarkable, though one showing "satellitism" is not included. The authors declare their intention "to rest for a few years from the ceaseless strain involved in compiling these volumes". Ten large volumes! Most of us would rest happily on having prepared any one of them.

Manipulative Treatment for the Medical Practitioner. T. Marlin, M.D., M.B., Ch.B., D.P.H., D.M.R.E., Medical Officer in Charge of Massage, Electrotherapeutics, and Light Dept., University College Hospital, London. 133 pages, illustrated. Price $3.45. Ed. Arnold, London; Macmillan Co., Toronto, 1934.

In the preface of this unusual little book the author suggests that the manipulations described be first mastered and the explanation of the results obtained be sought afterwards. Despite this suggestion the work is not wholly empirical. Principles are laid down, but they are not elaborated. The various steps in remedial manipulation as applied to joints and muscles are clearly described and fairly well illustrated by photographs and diagrams. There is a short chapter on the selection of cases in which manipulation may be a benefit, but it cannot be considered as an adequate guide to the practitioner who may wish to add manipulative surgery to his therapeutic equipment. As a handbook of technique it should be very useful to the doctor who already knows the main principles of physical treatment. Such a knowledge can only be made useful by long practice in the various manipulations described, and this point is well emphasized by the author.

Modern Clinical Syphilology. John H. Stokes, M.D., Duhring Professor of Dermatology and Syphilology, University of Pennsylvania School of Medicine. Second edition, 1,400 pages, illustrated. Price $13.50. W. B. Saunders, London & Phila.; McAinsh & Co., Toronto, 1934.

This is very nearly a new book. When there is nearly ten years between two editions, and the preparation of the second edition takes three years, and, finally, and chiefly, the subject is syphilis, then one may well say it is a new book. Dr. Stokes has prepared as comprehensive a work as might be expected from one of his great experience as a syphilologist. It is always difficult to meet the demands of



Radiograph revealing gastric carcinoma.

AT LEAST 35% of cancer deaths are caused by gastric carcinoma. Yet the disease offers virtually no early positive clinical symptoms. The enlarged abdomen, the gastric hemorrhage, pyloric obstruction might easily be secondary to gastric cancer . . . Apparent symptoms of angina pectoris have been found to be really those of gastric cancer involving the cardiac orifice. But these physical signs cannot safely be considered conclusive.

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the student, the practitioner, and the specialist all at once. Possibly the latter will find less for him here than the others, but not so very much. He will find a remarkably full guide to the literature, and he will have the experience of a sound authority. The practitioner will probably be the best suited. He will find a text-book which will reinforce what he has been taught and add yet more. Perhaps there is a labouring of detail in such chapters as the "Clinical Approach to Syphilis" and "The Examination of the Patient", but better too much than too little in some things. The dogmatism which is inescapable for clear cut and forceful teaching is there, but is not absolute; better still, it is founded on good judgment and sound experience. The work of American investigators is fully quoted; it is even re-quoted. Dr. Stokes feels that it is time to shed what he calls the "purely imitative swaddling clothes". Full acknowledgment however is given to work in other countries. The book is a solid comprehensive piece of work and will fully meet the needs of the practitioner.

Modern Treatment of Hæmorrhoids. J. F. Montague, M.D., F.A.C.S., Rectal Clinic, University and Bellevue Hospital. Third edition, 318 pages, illustrated. Price $6.50. J. B. Lippincott, Phila., London and Montreal, 1934.

It is six years since the appearance of the second edition of Montague's excellent monograph, and during that period sufficient progress has been made in the knowledge of rectal diseases to justify a new edition. The subject is handled in such a way as to make the book valuable to both general practitioners and rectal specialists. It is very exhaustive in the material covered, which is presented in a very readable manner. The chapter on etiology of hæmorrhoids, could with advantage be much condensed. After all, there seems little to be gained by putting up straw men and knocking them down. There is plenty of excellent material in the book without this to repay the physician many times for his pains in studying it carefully.

All methods of treatment used at the present time are described in great detail, so that the reader will have no difficulty in finding all the information he desires as to any particular method he wishes to adopt. The general practitioner will be most interested in those sections of the book that deal with methods of examination, the diagnosis and differential diagnosis of rectal diseases, and the methods of treating hæmorrhoids, and he will not find a better book to consult. It should, too, enable him the better to tell what cases he should refer to the specialist. Any physician who follows the teachings of Montague is likely to find fewer of his patients seeking the advice of the specialist and more of them being treated successfully, by himself.

X-Ray and Radium Injuries. Hector A. Colwell, M.B., Ph.D., M.R.C.P., D.P.H., and Sidney Russ, C.B.E., D.Sc., F. Inst. P., Barnato Joel Laboratories, Middlesex Hospital. 212 pages, illustrated. Price $4.50. Oxford University Press, London; McAinsh & Co., Toronto, 1934.

It is some time since medical literature was enriched by the splendid publication "Radium, X-Rays and the Living Cells" by Colwell and Russ. After a lapse of many years the same authors have favoured us with a most comprehensive and masterful work, "X-ray and Radium Injuries, Prevention and Treatment". This book should find a place on the desks of medical practitioners. It contains information which should be known by those who are to advise treatment by radiation and those who are to administer it.

Commencing with the skin, the authors discuss with sustained interest the effect of radiation upon the different systems. The portion devoted to the skin will repay careful study. It is only by the most scrupulous attention to detail that unfortunate results can be avoided, and in the present publication we have summed up for us not only the experience of the authors but that of others. In the early days of x-ray and radium therapy skin lesions were common. With the advent of high voltage radiation we are again seeing an increasing number of unfortunate results, caused usually by excessive radiation. It is well to remember that skin cancer may be caused by excessive radiation. At present, when the advocates of radiation are urging the treatment of breast carcinoma by high voltage x-ray and radium bombs it is well to realize that pulmonary fibrosis with its sequelæ may result. This is a real danger and may result from "a single dose in excess of 140 per cent S.U.D., and if doses of 40 to 100 per cent S.U.D. are repeated over the same parts of the lung fibrosis is noted in over 80 per cent of the cases".

A very comprehensive chapter has been devoted to the generative system, which will repay careful reading. This chapter is particularly important on account of the number of pelvic disorders and diseases discussed. The question is often asked, would an x-ray examination of the abdomen during pregnancy be injurious? To this there seems to be a unanimous answer that it can be undertaken with perfect safety to mother and child.

The chapter on radio-active waters should be studied and remembered.

It is fortunate that such a book as this has appeared at a time when governments are embarking upon the practice of medicine by the establishing of radium centres for the treatment of malignant disease. Those in authority should read this book, to comprehend something of the dangers which they are liberating. It is the duty of such to see that those who handle these dangerous radiations are thoroughly competent.

The Chemistry of the Hormones. Benjamin Harrow, Ph.D., Associate Professor of Chemistry, College of the City of New York, and Carl P. Sherwin, D.Sc., M.D., Dr.P.H., St. Vincent's Hospital, New York City. 227 pages. Price $2.50. Williams and Wilkins, Baltimore, 1934.

This book consists of a conscientiously-compiled series of abstracts and quotations from the writings of those who have described the more generally-approved methods for obtaining purified preparations of the active principles of endocrine glands, or have studied the chemical properties of these principles; only occasionally have the authors ventured to make suggestions or criticisms on their own account. As the pharmacological properties, physiological functions, and therapeutic possibilities of the hormones are hardly discussed at all (even the methods of biological assay, important as they are in purification studies, receive scant attention), the work is not likely to appeal to medical readers, except those actively interested in this field of research. From the standpoint of clarity and accuracy, the book leaves something to be desired; there are too many misprints. Although the preface bears the date April, 1934, a number of important papers published in the summer of 1933 have been ignored; the earlier literature has been rather thoroughly surveyed, though the authors wisely abstain from discussing controversial questions of priority in discovery.

Human Sex Anatomy. A Topographical Hand Atlas. Robert L. Dickinson, M.D., F.A.C.S. 145 pages, price $10.00. Williams & Wilkins Co., Baltimore, 1933.

The information this very unique book contains is not to be found in the ordinary treatise on obstetrics, gynæcology or physiology, and it should fill a much desired need. The author is well qualified for his task, being Director of Research of the National Committee on Maternal Welfare, and having been keenly interested in all questions of sexual physiology and pathology for many years. He was at one time Chair-

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man of a Committee appointed by the American Gynæcological Society to investigate the question of contraception and sterilization. As the book is an Atlas the text has been kept at a minimum, but gives a concise description of the anatomy and physiology of sex, coitus, and contraception. The illustrations number more than one thousand, many of them being life-size, and are mostly from the pen of an author whose well known ability as an artist suggests an excellence which is more than fulfilled. In compiling such a work an author is constantly faced by the twin dangers of only presenting the common-place or of becoming pornographic. Dr. Dickinson has avoided both these dangers.

Wish-Hunting in the Unconscious. An Analysis of Psycho-Analysis. Milton Harrington, M.D., Psychiatrist, Institution for Male Defective Delinquents, Napanoch, N.Y. 189 pages. Price, $3.00. Macmillan Company, New York and Toronto, 1934.

The author of this very readable and interesting book is a believer in mechanistic psychology, to a description of which he devotes the last chapter under the title of "The Alternative to Psycho-analysis". Five other chapters are devoted to a description of psycho-analysis and a critical review of both the theory and the practice. Dr. Harrington concludes that psycho-analysis has contributed nothing to mental hygiene, that it is of no value in the treatment of psychoses, but is of some in the treatment of the neuroses. To him it is a question as to whether or not it is simply another form of faith healing through suggestion.

The Life of Sir Robert Jones. Frederick Watson. 327 pages. Price $3.75. Hodder & Stoughton Ltd., London; William Wood, Baltimore, 1934.

This admirable biography of Sir Robert Jones, written with insight and sympathy by his son-in-law, relates the stimulating story of the life and work of a great man. All things conspired to set for him a stage in life replete with great possibilities. It is no small part of his greatness that he possessed the foresight, the interest, and the energy to utilize to the full the unique opportunities which presented themselves to him.

Robert Jones was born in Liverpool in 1857. His father was a man of such independence of thought that he preferred to abandon the prosperous career his father had planned for him, and earn a precarious but independent living as a journalist. In this home, blest with unfailing cheerfulness, but often in financial distress, Robert Jones spent his boyhood. It would seem as though the first great opportunity came when Hugh Owen Thomas, his uncle by marriage, offered to take him into his home and bring him up. That transference marked out his career. He was adopted into the childless home of Hugh Owen Thomas as a son. He came into contact with the most extensive and most unique practice in orthopædic surgery. He was under the paternal tuition of a singular mind.

Robert Jones was a man of unusual character. His energy was unbounded, and, trained in the enormous practice which Thomas had acquired, he never lost the habits of rapid and prolonged labour. He was able thus to see an incredible number of patients. He continued Thomas' free Sunday Clinic for the poor, and was accustomed to treat two thousand such patients a year. No matter how long and arduous the day's work, he had time and energy left at the end to engage in recreation, and usually this was some form of physical activity. He was an ardent cricketer and boxer, and followed these sports to his death with devoted interest. Military activities interested him very early in his career, and this interest was sustained throughout his life. Unlike his uncle, who was reserved and controversial, Sir Robert was genial in his nature and had a supreme capacity for attracting and holding friends.

Perhaps his greatest quality was the foresight which enabled him to see into the future and plan reforms and institutions for the care of cripples, in advance of his times. He lived to see his dreams realized, not only in his own country but in America and many European countries also. The system of open-air hospitals for crippled children, the organization of orthopædic hospitals for the care of soldiers, and the National Scheme for the Care of Cripples were the children of his fertile and far-seeing mind, and stand as monuments to his energy and tact and persuasiveness.

This is the well-told story of a stimulating and stirring personality who accomplished much in his life. Orthopædic surgery and social welfare of today owe him much.

Diseases Peculiar to Civilized Man. George Crile, M.D. 427 pages, illustrated. Price $6.00. Macmillan Co., New York and Toronto, 1934.

Doctor Crile presents his case in compact form in support of his argument for adrenal denervation as a surgical measure to relieve patients suffering from disturbance of the brain, thyroid, adrenal and sympathetic systems. This is the kinetic system and any part of this may be hyperactive. After dealing with the anatomy, physiology, pathological physiology and the development of the adrenal glands he seeks to show that hyperadrenalism is a very real condition in hyperthyroidism, neuro-circulatory asthenia, peptic ulcer, epilepsy, diabetes, psychoneurosis and hypertension. Case histories are submitted and the results of his experience with adrenal denervation presented. His argument is certainly forceful. He believes that the adrenal secretion is the fulminate which explodes the charge in the thyroid or brain. The technique of adrenal denervation is given and is by no means a simple procedure.

The book really represents spade work in an unexplored field, and, after due allowance is made for Dr. Crile's hyper-enthusiasm, the reader is convinced that his ideas are worthwhile and have a physiological basis.

Constructive Eugenics and Rational Marriage. Morris Siegel, M.D. 196 pages. Price $2.50. McClelland & Stewart, Toronto, 1934.

This book opens with an introduction by Chancellor H. P. Whidden, McMaster University, and a foreword by Drs. John R. Parry and John P. Morton.

In reading this presentation of an important subject which finally leads to a program for dealing with the problems as revealed, it is difficult to keep pace with an author who makes so many statements contrary to accepted views without producing evidence to support them. When he says that all the children in an orphanage have the same environment, and that, therefore, any differences in their attainments, mood and character are the result of inborn qualities, it is evident that Doctor Siegel's idea of environment is unusual. He states that dementia præcox types are hereditary, and that "we know that a good deal of crime, immoral conduct, and addiction to alcohol or narcotics is due to weak or poor inheritance." The editorial "we" as used here is somewhat confusing; the reviewer would like to know who are the "we" and also the proof for such statements. These examples are taken out of the first few pages of the book to illustrate the type of statements upon which the author builds his case.

The second chapter is devoted to heredity. Here again it seems that the author's enthusiasm runs away with him, for where are the case histories of syphilis showing horrible manifestations in the third and fourth generation? Further, it is questionable if male morons never get along and fill the gaols, hospitals and public institutions.

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faulty heredity, that insanity is on the increase, that tuberculosis develops because of an inherited low-grade immunity, and that defectives are always potential criminals, are the grounds upon which action is urged. The program presented is what the author describes as constructive eugenics, in distinction from all the restrictive eugenic methods. He would have eugenics taught in the public schools, more instruction in heredity to undergraduates in medicine, post-graduate instruction, and a Dominion Eugenics Department, to register family pedigrees, among other things, which incidentally would require amendments to the British North America Act. Doctor Siegel evidently believes it possible, through a process of education, to have the man and woman of the future select their life-partners on the basis of their family pedigree. That the program will be effective is claimed by the author in such words as: "Through an efficient working eugenic program we may reasonably expect a considerable reduction in the incidence of and mortality from cancer within the next half-century." Doctor Gordon Bates will be shocked to hear that "Social hygiene is concerned only with the prevention of the spread of venereal disease". However, it is this question which provokes from the author a recommendation for a law to require a medical examination before marriage. It is a good thing to have men of vision, but preferably their feet should rest on solid ground. It is difficult to recommend a book that is so full of inaccuracies; excepting to those who are familiar enough with the subject to draw their own conclusions.

Neurobiologie de l'Hallucination. Raoul Mourgue, Lauréat de l'Institut de France, Médecin des Asiles. 416 pages. Price 91 francs. Maurice Lamertin, Bruxelles, 1932.

It is unlikely that Dr. Mourgue's book will have a wide appeal. It is on a highly specialized subject, and is not written to meet the ordinary medical man's capacity as regards knowledge of psychiatry. But this is not said in criticism. Indeed, we feel that the strength of the book lies in its close attention to detail and its synthesis of fact and reasoning. It is stamped with that indefinable element of erudition and scholarly attainments which is as rare as it is welcome. Dr. Mourgue begins his study by reviewing the history of hallucinations, and shows that the balance of evidence is against the idea that a hallucination is an intensified image. The part played by the motor elements is given great prominence, and classical cases of hallucinations associated with cardiac disease are given careful investigation.

The book is worthy of careful perusal; indeed, it cannot be otherwise appreciated. We recommend it to those who wish to follow modern developments of ideas in the psychological field.

Japanese Medicine. Y. Fujikawa, M.D. Translated from the German by John Ruhrah, M.D. Clio Medica No. 12. 114 pages, illustrated. Price $1.50. Paul B. Hoeber, New York, 1934.

The first ten chapters of this small volume deal with medical developments from the Mythical Period to 1911. Each chapter is headed by the name of the period of which it treats. In nearly all cases the period name is derived from the name of the site of the headquarters of the government of the day. The history is written about the names of those who have had to do with the advancement of the medical art in Japan, and, though the introduction of so many names of eras, dynasties, rulers, and now obscure medical men of the past is somewhat confusing to one in a hurry (the one for whom the book was written), it must be admitted that a wealth of fact including dates is incorporated in these few small pages. The eleventh and final chapter, dealing with developments in medicine in Japan since 1911, was written by Kageyas W. Amano, M.D., D.Sc.(Med.). It is to be regretted that for the sake of brevity the works of Shiga, Takamine, Kitasato, Noguchi, Yamagiwa, Hata, Inada, and Ido and other scientists of world-wide and undying fame could only be referred to in a short paragraph for each. A concise statement regarding present day and recent medical schools and education, medical literature, and hospitals brings this chapter and the text to a close.

Medicine Man in China. A. Gervais. Translated from the French by Vincent Sheean. 336 pages. Price $2.75. Frederick A. Stokes Co., New York, 1934.

One seldom finds in a translation the freshness and force of the original. Still more difficult is it to preserve so fragile a thing as humour. In this story it is pleasant to find both these difficulties so well overcome. There is here no serious attempt at a study of Chinese life and character. What the author does, and does so well, is to define, with the sharpest of lines, the difference between the Chinese and the Western point of view. And he has in his medical experiences an additional accentuation of these differences. Take the story of the man who came in to the hospital with an arm swollen and crackling with gas gangrene, under the combined influences of a horse-bite and a plaster of cow-dung. He steadily refused the only reasonable treatment, amputation; he must have two arms to do his work, he said. All he wanted was a "good medicine" which he firmly believed the doctor must have, and no argument to the contrary had the least effect on him. At last he offered the doctor a silver dollar, which the nursing sister took and handed back. Dr. Gervais goes on:

> "I made every effort to get him to understand that if there was any possibility of saving his arm I should have saved it, without the ridiculous and unpleasant offer of his silver coin. I was, in fact, displeased and a little vexed. 'Oh, don't worry about that, doctor,' said the sister composedly. 'I had that coin in my hands. It was false'."

The chief figures are the author, his colleague Morel, and Hollington, the British Consul-General. The two doctors are enthusiastic, and want to help the people in every way they can. But to their surprise and mortification they are asked to do only what the Chinese themselves want. Hollington, who has had a longer experience, and is also of a shrewder cast, if less ardent, is inclined to leave things as they are. The three men frequently talk together, and the differences between them stand out hardly less sharply than between the East and the West. But in spite of his lack of idealism (perhaps because of it) it is Hollington who shows Gervais how to win in a very disagreeable and difficult situation. The son of a local Chinese general had been accidently wounded during a quarrel at a student's card-party. The General wanted to shoot the other members of the party at once, and was only just persuaded to postpone the execution to the moment when his son should die, an event which appeared imminent. Dr. Gervais was appealed to, but whilst the General was very polite he was not to be moved. Hollington advised taking advantage of the only thing likely to be of avail, which was the affection of the General for his son. The boy had very little chance of recovering, but if he were to be put out of the hospital he would have had none at all, and this was what Gervais threatened the General with, and won. But the General would not believe that he really wanted to save the other boys' lives. "Tell me the truth", he asked the doctor later on, "Why were you so bent on saving those young men?" The answer was what any other European would have given, but Hollington said it was a pretty poor one from the Chinese point of view!

We hope that Dr. Gervais will give us more books, even if he never gets any further in his solution of the mystery of China. Not that he is likely to, nor that it will make very much difference.